Final
Long-Term Monitoring Event Report
March 2012

Chemical Insecticide Corporation Superfund Site
Operable Unit 4 – Groundwater
30 Whitman Avenue
Edison Township, Middlesex County, New Jersey

Prepared for:

U.S. Army Corps of Engineers, Kansas City District
601 East 12th Street
Kansas City, Missouri 64106
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LIST OF ACRONYMS AND ABBREVIATIONS

AGI	Additional Groundwater Investigation
BGS	Below Ground Surface
BHC	Benzene Hexachloride
CIC	Chemical Insecticide Corporation
CM/SEC	Centimeters/second
COC	Contaminant of Concern
Conti	Conti Environment & Infrastructure, Inc.
CSM	Conceptual Site Model
CTI	CTI and Associates, Inc.
DESA	Division of Environmental Science and Assessment
DO	Dissolved Oxygen
DOT	Department of Transportation
DQCR	Daily Quality Control Report
EDD	Electronic Data Deliverable
FT	Foot
GPD/FT	Gallons/day/ft^2
GWQS	NJDEP's Class IIA Groundwater Quality Standards
HDR/OBG	HDR/O'Brein & Gere
ICP-AES	Inductively Coupled Plasma – Atomic Emission Spectrometry
ICP-MS	Inductively Coupled Plasma - Mass Spectrometry
KCD	Kansas City District
LTM	Long-Term Monitoring
LTMP	Long-Term Monitoring Plan
LTRA	Long-Term Response Action
MCL	Maximum Contaminant Level
ML/MIN	Milliliters/Minute
MSL	Mean Sea Level
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NJDEP	New Jersey Department of Environmental Protection
NPL	National Priorities List
OBG	O'Brien & Gere
ORP	Oxidation Reduction Potential
OU	Operable Unit
PCE	Tetrachloroethene
QA	Quality Assurance
QC	Quality Control
RG	Remediation Goal
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TCE	Trichloroethene
TCL	Target Compound List
TOC	Top of Casing
USACE	United States Army Corps of Engineers

USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

1. Introduction

CTI and Associates, Inc. (CTI) performed long-term monitoring (LTM) services as part of Groundwater Operable Unit (OU) 4 at the Chemical Insecticide Corporation (CIC) Site in Edison Township, Middlesex County, New Jersey, under Long-Term Response Action (LTRA) Contract No. W912DQ-08-D-0031, Delivery Order 011 with the U.S. Army Corps of Engineers, Kansas City District (USACE-KCD). USACE-KCD provides technical assistance to U.S. Environmental Protection Agency (USEPA) Region II under an Inter-Agency Agreement.

The CIC Site has been addressed in the following four remedial phases to date:

- OU1, completed in 1994, was an interim remedy to control contaminated surface water runoff from the Site;

- OU3, completed in 1997, was a final remedy to address contaminated soil and sediment in offsite creek areas;

- OU2, completed in 2005, was a final remedy to address contaminated surface and subsurface soils at the Site and surrounding properties; and

- OU4, currently in progress, is the final remedy to address contaminated groundwater and consists of LTM and institutional controls.

USEPA issued a Record of Decision (ROD) for OU4 in December 2003 to address residual groundwater contamination at the CIC Site and surrounding properties including Metroplex Corporation and Total TEC to the east, Morris Companies (formerly Allied Chemical Company) to the south, and Muller Machinery to the west. The Site and these surrounding properties are collectively defined as the CIC Study Area and encompass approximately 70 acres. The site location is presented on Figure 1-1. The OU4 ROD was based on data collected up to 2002 and prior to the implementation of the OU2 remedial action at the CIC Study Area. The major components of the selected remedy for OU4 include:

- Instituting controls to restrict the installation of wells and the use of groundwater in the area of groundwater contamination; and

- Implementing a long-term groundwater sampling program to monitor the nature and extent of contamination and assess the migration and potential attenuation of the plume over time.

The New Jersey Department of Environmental Protection (NJDEP) deferred their concurrence with the OU4 ROD until the OU2 remedial action could be completed and the effects of that remedy evaluated through the proposed LTM program. NJDEP stated that future concurrence with the OU4 ROD would be based on the monitoring data collected after the completion of the OU2 remedial action and the evaluation of any additional studies needed to more accurately predict the expected time frames needed to reach remediation goals in groundwater.

1.1. Purpose and Scope

This project is currently in the LTM phase to meet the objectives of the OU4 ROD (monitor the nature and extent of contamination and assess the migration and potential attenuation of the plume over time). To date, ten LTM sampling events have been conducted as follows:

- Additional Groundwater Investigation (AGI)/1st Quarter LTM Event – July/August 2007;
- 2nd Quarter LTM Event – December 2007;
- 3rd Quarter LTM Event – March 2008;
- 4th Quarter LTM Event – June 2008;
- 5th Quarter LTM Event – September 2008;
- 6th LTM Event – March 2009;
- 7th LTM Event – December 2009;
- 8th LTM Event – December 2010;
- 9th LTM Event – July 2011; and,
- 10th LTM Event - March 2012.

Groundwater sampling at the CIC Site is conducted in accordance with the *Final Long-Term Monitoring Plan* (HDR/O'Brien & Gere, October 2009). This plan was prepared as a formal mechanism and timetable for assessing the extent and movement of groundwater contamination across the CIC Study Area over the course of the LTM program.

Based on the stable groundwater plume at the CIC Study Area, the LTM program is scheduled to continue for five years (2009 through 2013) with sampling conducted at nine month intervals. This sampling frequency (representing an approximate annual basis) will allow for sufficient collection of data during different seasons to allow for a complete assessment of groundwater elevation, contaminant levels, and plume migration over time. It will also provide adequate information for USEPA to conduct their next scheduled 5-year review during the winter of 2013.

This report documents the results of 10th LTM groundwater monitoring event (March 2012 LTM Event) performed in March 2012.

1.2. Report Organization

The remainder of this report contains descriptions and results of the activities performed as part of the March 2012 LTM Event. Brief summaries of the remaining sections are presented below.

- **Section 2 – Study Area Background and Physical Setting** describes the physical setting of the CIC Study Area based on previous investigations and reports and summarizes the investigative and remedial activities completed to date.
- **Section 3 – Scope of Monitoring Event** summarizes the field work completed as part of the March 2012 LTM Event.
- **Section 4 – Monitoring Event Results** presents the groundwater analytical results from the March 2012 LTM Event.
- **Section 5 – Conclusions & Recommendations** discusses the conclusions based on the analytical results and groundwater flow direction from the March 2012 LTM Event, summarizes data trends, and presents the upcoming schedule for the project. This section also discusses any

recommended well maintenance and changes to the current LTM program based on the evaluation of the data.

2. Study Area Background and Physical Setting

This section summarizes the physical setting, past operations, and previous investigative and remedial activities at the CIC Study Area. Figure 1-1 depicts the CIC Study Area and the location of the existing monitoring well network.

2.1. Site Description and Location

The CIC Site is a fenced 5.7-acre property located at 30 Whitman Avenue in Edison Township, Middlesex County, New Jersey. It is bounded on the north by Interstate 287, on the east by a 35-foot wide Public Service Electric and Gas easement and active commercial properties owned by Metroplex Corporation and Total TEC, on the south by a large warehouse owned by Morris Companies and property once occupied by the former Allied Chemical Company, and on the west by a vacant industrial property formerly owned by Muller Machinery and the Conrail/CSX railroad right-of-way. The CIC Study Area encompasses the Site and these surrounding neighboring properties where investigations and remedial activities have been conducted to date. The CIC Site is currently owned by Edison Township, is grass covered, and contains rip rap channels and grass-lined swale to allow for storm water runoff and drainage.

The nearest residential properties are located approximately 300 to 400 feet away from the Site and are separated from the Site by either Interstate 287 to the north or the Conrail/CSX railroad right-of-way to the west. There are no permanent surface water bodies on the CIC Site. After heavy precipitation, storm water runoff drains toward the northeast corner of the Site where it discharges into an underground conduit designed to direct storm water to the existing storm sewer line located along the southbound lane of Interstate 287. The CIC Study Area drains to an unnamed tributary of Mill Brook, located southeast of the CIC Study Area, which flows into the Raritan River approximately four miles downstream of the Site. Both the unnamed tributary and Mill Brook run through residential areas. The residents near these tributaries and the residents directly surrounding the Site all obtain potable water from a public water supply system located approximately eight miles from the Site.

Potential contaminant source areas specific to the CIC property include former process water lagoons or impoundments, former areas of buried drums located on the eastern property boundary, and a former septic pit located on the western property boundary. Several former waste drum storage and debris areas, along with former remnant structures such as pipes, conduits, and tanks also appeared to have been the potential sources for specific contaminants. These collective sources are specific to the CIC Site itself and were not found elsewhere (or were found to be limited) in the CIC Study Area.

2.2. Environmental Setting

The physical characteristics presented in this section represent a compilation of data gathered and reported during the various phases of field investigation activities to date. This section is primarily based on information gathered prior to the implementation of the OU2 remedy to address contaminated surface and subsurface soils at the Site and surrounding properties. Information on changes to drainage and geology in the CIC Study Area as a result of the soil removal program is also presented in this section, and was obtained from Conti Environment & Infrastructure, Inc.'s *Remedial*

Action Report (Conti, September 2007). Finally, data gathered during the Additional Groundwater Investigation (AGI) performed by HDR/OBG in August 2007 (HDR/OBG, September 2008) in support of updating the conceptual site model (CSM) is discussed in this section.

2.2.1. Topography

The CIC Site itself is situated on a flat lying property at an elevation of approximately 115 feet relative to mean sea level (msl). As a result of the OU2 soil remedy, this area is now graded and gently slopes to the east toward the Metroplex Corporation property. Further east, the land surface flattens out and slopes very gently to the east-southeast. A steep grade sloping down to the roadbed of Interstate 287 (approximate elevation of 92 to 94 feet msl) is located immediately north of the CIC Site. To the west, the land surface rises gradually before sloping downward to the excavated Conrail/CSX railroad grade. Directly beyond the fence to the south is an excavated railroad bed which was filled in during the OU2 remedy, and separates the CIC property from the Morris Companies property.

2.2.2. Hydrology

On a regional scale, the CIC Site itself occupies a high point in the northwest portion of the Mill Brook drainage basin. The ultimate receiving water body is the Raritan River located approximately four miles southwest of the Site. Historical topographic maps and aerial photographs indicate that the Mill Brook watershed has undergone tremendous change over the past 50 years, experiencing a combination of expressway construction, business office, manufacturing, industrial, and residential development. In general, the CIC Study Area was once wetlands and substantial filling of the CIC Site is evident as early as 1939.

In the 1940's and 1950's, surface water originating on the CIC Site drained by overland runoff through several distinctly observable drainage ditches eastward through the unnamed tributary to Mill Brook. Prior to the installation of the interim cap in 1994, surface conditions at the CIC Site included puddles, ruts, and sumps in which standing water accumulated, particularly after heavy or persistent precipitation. Runoff from precipitation that did not infiltrate into CIC Site soils flowed to the unnamed tributary via a drainage ditch.

The average annual yearly precipitation total in New Brunswick is 45.50 inches, with August (4.90 inches) the wettest month, and February (2.96 inches) the driest. Precipitation is generally well distributed throughout the year. However, some year-to-year variation in amounts recorded in late summer and early autumn may result from the northward passage of storms originating in the tropics. During years in which these seasonal storms occur, annual precipitation totals tend to be higher than normal and intense rain for short periods increases. Based on rainfall-intensity return periods from 1913 through 1951 for Trenton, New Jersey, approximately 30 miles south of the CIC site, a rainfall intensity of 1 inch per hour for a duration of 2 hours may be expected once every 5 years.

Currently, there is no uncontrolled drainage from the CIC Site and there has been no evidence of flooding observed during the groundwater sampling events. As part of the restoration phase of the OU2 remedy, a headwall and culvert drainage structure were engineered and installed in the northeast portion of the property to direct storm water to the existing storm sewer line running along Interstate 287. This allows storm water to flow into the drainage swale adjacent to the southbound lane of Interstate 287. A riprap swale was constructed on Site to direct storm water to the drainage structure.

A grass-lined drainage swale was also constructed to drain storm water to the riprap swale from the southern portion of the CIC Site. These surface drainage features are presented on Figure 1-1.

2.2.3. Geology

The CIC Study Area lies on the approximate boundary between the Atlantic Coastal Plain physiographic province and the Triassic Lowlands in the southeastern portion of the Piedmont physiographic province. Regionally, the Triassic Lowlands are characterized by underlying bedrock of northwestward sloping sedimentary bedrock deposits of shale, siltstone, and sandstone expressed at the surface by gently rolling lowlands. The sedimentary deposits are occasionally interrupted by basaltic lava flows and diabase intrusions which are more resistant to weathering than the sedimentary deposits and are subsequently expressed as topographic ridges. The Watchung Mountains, located approximately seven miles to the northwest, are the closest of these ridges. The coastal plain sediments consist in part of alternating layers of unconsolidated sands and clays, dipping gently toward the southeast.

In the vicinity of the CIC Study Area, bedrock consists of the Brunswick Formation of the Triassic age Newark group. The Brunswick Formation typically consists of soft, reddish-brown shale with some interbedded siltstone and sandstone. The formation is often highly fractured and easily weathered to reddish-brown clay. There is typically a layer of weathered or fragmented shale overlying more competent bedrock. In the Coastal Plain province, bedrock is overlain by alternating layers of unconsolidated sands, gravels, and clays, which regionally include the Raritan and Magothy Formations. The Raritan and Magothy deposits mapped in the vicinity of the Site are very thin to absent and are not easily differentiated from overlying fluvio-glacial deposits.

Based on the evaluation of site information generated prior to and after the OU2 remedy, the geology at the CIC Study Area consists of the following four stratigraphic units:

- **Fill** – Fill materials comprise the upper 2 to 12 feet of unconsolidated materials (designated as Unit I in previous remedial investigation [RI] reports). The fill is predominantly composed of medium to coarse sand with subordinate amounts of gravel, silt, and clay, and minor amounts of debris. This fill unit was altered by the OU2 remedial action which involved excavation of CIC Study Area soils to varying depths, in excess of 20 feet below grade in some areas, based on source removal requirements. Backfill of excavated areas consisted of two distinct materials. A New Jersey (DOT) I-9 coarse sand material was used below the natural water table to allow for drainage. A common fill was used above the water table.

- **Fluvio-glacial** – Beneath the fill are 2 to 35 feet of gravels, silts, and clays that comprise the Pennsauken Formation (designated as Unit II in previous RI reports). Such deposits are fluvio-glacial in origin resulting in a heterogeneous and laterally discontinuous depositional nature. As with the fill unit, this fluvio-glacial deposit was altered in some areas of the CIC Study Area as a result of the OU2 remedy.

- **Weathered bedrock (saprolite)** – Underlying the fluvio-glacial deposits are 4 to 45 feet of red clays and silts with lesser amounts of sand and gravel (designated as Unit III in previous RI reports). This unit is present throughout the CIC Study Area and appears to function as a semi-confining hydrologic barrier to vertical groundwater flow. In general, this geologic unit is relatively thin; less than 15 feet at the CIC Site, and increases in thickness toward the east. This unit appears to be a weathering product of the underlying Brunswick Formation, but may have been locally reworked by fluvio-glacial processes. The contact between this unit and the underlying bedrock is typically transitional based on the degree of bedrock weathering.

- **Bedrock** – The Brunswick Formation (red shale), which is the youngest formation of the Triassic-aged Newark Group, occurs from 15 to 65 feet below grade (designated as Unit IV in previous RI reports). The CIC Site itself appears to be located on a bedrock topographic high, with bedrock occurring at deeper depths (relative to grade) east and south of the CIC Study Area.

During the installation of temporary and permanent wells during the AGI, subsurface soil conditions were evaluated to assess the stratigraphic conditions noted during previous investigations and changes as a result of the OU2 soil remedial action. No significant changes from the stratigraphic units noted above were observed.

2.2.4. Hydrogeology

Based on the evaluation of site hydrogeologic information generated prior to and after the OU2 remedy, the interpretation of the hydrogeology at the CIC Study Area consists of two separate groundwater flow regimes: an unconfined overburden zone comprised of the fill and fluvio-glacial deposits (Units I and II) and a partially confined, fractured bedrock water-bearing zone (Unit IV). The unconfined overburden zone and the fractured bedrock water-bearing zone are separated by a leaky weathered bedrock confining layer (Unit III). However, based on observations reported by others during previous drilling, the hydrostratigraphic units appear to cross stratigraphic boundaries. Based on data collected during the AGI, the CSM was updated to reflect that the overburden aquifer consists of the entire zone above competent bedrock as opposed to the shallow overburden and deep overburden identified during previous investigations.

The overburden material and weathered bedrock (or saprolite) within the CIC Study Area comprise a single hydrostratigraphic unit although the weathered bedrock could be considered a leaky confining zone and may locally comprise a hydrostratigraphic unit. The saprolite (Unit III) acts as semi-confining layer and for all practical purposes, is not considered an aquifer but rather an aquitard.

Monitoring wells associated with the LTM well network include the following:

- Overburden wells screened at the top of the unconfined overburden aquifer,
- Transition wells screened just above competent bedrock in the weathered bedrock or saprolite (clays and silts identified as Unit III), and
- Bedrock wells screened in the fractured bedrock water-bearing zone.

The OU2 remedy resulted in the alteration of the overburden geology within certain areas. The aquifer characteristics of the overburden geology (Units I and II) were altered by excavation and removal of fill and native soil and backfilling of the excavations with a more permeable material relative to the excavated soils. In some portions of the CIC Study Area, excavation extended to depth in excess of 20 feet below grade and extended to the saprolite (Unit III) semi-confining layer. Groundwater within the overburden aquifer has been encountered from 4 to 23 feet below grade throughout the CIC Study Area.

Based on the results presented in the AGI report, overall groundwater flow direction within the overburden aquifer does not appear to have been affected by the excavation and removal activities performed during the OU2 remedial action. Groundwater flow within the shallow bedrock (due in part to more closely spaced fracture spacing) behaves similarly to that of the unconfined (phreatic) aquifer. Flow within the deeper bedrock is controlled by fracture hydraulics.

During the Phase IV RI, data collected by Foster Wheeler Environmental Corporation during a constant rate 48-hour bedrock pump test at a well located in the northeast corner of the CIC Site indicated an average transmissivity of 111 square feet/day (ft^2/day) or 830 gallons/day/square foot (gpd/ft^2). Using an estimated 100 feet for the aquifer thickness, an average hydraulic conductivity of 1.11 feet/day or 4×10^{-4} centimeters/second (cm/sec) was estimated for the bedrock aquifer. Estimated storage coefficient values indicated semi-confined to confined bedrock aquifer conditions. Pump test results also indicated that there was little response in the overburden aquifer to pumping in the bedrock aquifer.

The hydraulic conductivity of the overburden materials decreases with depth (10^{-3} cm/sec shallow vs. 10^{-4} cm/sec right above rock). Overall horizontal groundwater flow is generally to the southeast, with flow directly from the CIC Site itself having a localized northeast flow direction (toward Interstate 287). The horizontal gradient typically ranges from 0.02 to 0.04 feet/feet. Based on the data collected during the AGI, the overall hydraulic gradient within the overburden aquifer for the CIC Study Area does not appear to have been affected by the OU2 remedy.

Groundwater flow within the first 20 to 50 feet of bedrock appears to behave more like groundwater flow within the overburden aquifer. Overall, groundwater flow within the shallow bedrock wells mimics the flow direction within the overburden aquifer. Groundwater flow within the deeper bedrock aquifer is expected to behave more consistent with regional hydraulic flow, which is generally to the southeast. However, in the northern portion of the CIC Site, flow is influenced by lower topography and the stormwater sewer system associated with Interstate 287, creating localized flow to the north and northeast.

Throughout the CIC Study Area, there is a downward vertical hydraulic groundwater flow component from the overburden aquifer to the shallow bedrock aquifer. The downward vertical flow component is impeded due to the low permeability of the weathered bedrock (saprolite) layer. There is some indication that, locally, groundwater within the deeper bedrock aquifer may exhibit an upward flow component to the shallow bedrock aquifer. The degree of hydraulic communication between the shallow and deeper bedrock is expected to vary based on fracture spacing and orientation.

2.3. Site History and Summary of Previous Investigations/Remedial Actions

CIC owned and operated the Site from 1954 to 1970. The Site was used for the formulating of, and possibly the manufacturing of, insecticides, fungicides, rodenticides, and herbicides. These formulating activities, combined with poor housekeeping, led to widespread chemical contamination at the Site, as well as migration of contaminants to offsite areas. At one time, the property consisted of approximately seven buildings used for the formulation/storage of pesticides and herbicides. Additionally, lagoons existed along the eastern property boundary that was reportedly used to hold some of the facility's wastewater.

In the mid-1960's, the Edison Department of Health and Human Resources became concerned about activity onsite due to numerous complaints from surrounding neighbors. In June 1966, the Edison Township Health Officer ordered the facility to stop discharging wastewater, oversaw disposal of leaking drums to eliminate an odor problem, and ordered the closing of the onsite lagoons.

In August 1970, CIC declared bankruptcy. Subsequently, Piscataway Associates purchased the property and demolished the production facilities by 1975.

In 1983, the former CIC facility was included in a USEPA/NJDEP dioxin-screening program that identified and sampled potential dioxin-contaminated sites. Sampling revealed low-level dioxin contamination in some of the former process areas, while results from neighboring properties did not show any evidence of dioxin contamination. While conducting the sampling at the Site, USEPA also collected additional samples for other commonly found pollutants. Data indicated widespread contamination onsite and limited contamination offsite.

Based on the results of these investigations, USEPA initiated an RI at the Site in July 1987. In August 1990, USEPA included the CIC Site on the National Priorities List (NPL). Concurrent with the remedial investigation / feasibility study (RI/FS), USEPA conducted several removal actions to mitigate risks associated with contaminated soil and surface water runoff from the Site.

In September 1989, USEPA issued a ROD for OU1, selecting an interim remedial action to control contaminated runoff from the CIC Site. The remedy consisted of installing a fence around the Site, clearing and grading, covering the Site with a high-density polyethylene surficial geo-cap liner to prevent infiltration of precipitation, and constructing a surface water runoff diversion system to collect uncontaminated surface water runoff from the cap and channel it to a drainage system. Construction of the interim remedy was completed in September 1994.

In March 1995, USEPA issued a ROD for OU3, selecting a remedy to address arsenic-contaminated soil and sediment in offsite creek areas. The remedy consisted of the excavation and offsite disposal of contaminated soil and sediment followed by restoration of offsite areas, stream beds, and wetlands. The OU3 remedy was completed in April 1997.

While proceeding with the OU1 and OU3 remedies, USEPA continued the RI/FS work for OU2 and OU4, collecting additional samples at the CIC Site and neighboring properties and evaluating alternatives for contaminated soil and groundwater. USEPA and NJDEP elected to proceed with the OU2 soil remedy independent of the groundwater remedy (OU4) since the interim cap was approaching the end of its projected life span and additional work remained to complete the groundwater RI/FS.

In September 2000, USEPA issued a ROD for OU2, selecting a remedy to address contaminated soil for the CIC and Muller properties and portions of the Metroplex and Morris Companies properties (collectively, the CIC Study Area). The remedy consisted of the excavation and offsite disposal of contaminated soil followed by restoration of the affected areas. The major objectives of the OU2 remedy were to reduce and eliminate the direct contact pathway for human exposure and the source of groundwater contamination. This action was also anticipated to have a reductive response to future groundwater contamination. The OU2 remedy was completed in May 2005.

Groundwater investigatory work was completed in 2002 and in December 2003, USEPA issued a ROD for OU4, selecting a remedy to address groundwater contamination associated with the CIC Study Area. The remedy consists of a long-term groundwater monitoring plan and the implementation of institutional controls.

A number of soil, sediment, surface water, groundwater, and air investigations have been conducted at the CIC Study Area, dating back to 1983. To summarize, these have included the following:

- 1983 investigation of the Site as part of a State-wide dioxin screening program;
- 1984 investigation by NJDEP in support of ranking the Site with the Hazard Ranking System;
- 1985 investigation by NUS Corporation as the USEPA Field Investigation Team;
- 1992 and 1993 investigations by USEPA at offsite locations;
- Four phases of RI/FS work beginning in 1987 and concluding in 1999;
- 1994 interim remedial action for OU1 (contaminated surface water runoff);
- 1997 remedial action for OU3 (contaminated offsite soil and sediment);
- 1998 post-cap sampling by USEPA;
- 2003 OU2 baseline groundwater sampling event by TAMS, under contract to USEPA;
- 2005 remedial action for OU2 (Site soils and source materials);
- 2005 OU2 post-remediation groundwater sampling event by USEPA;
- 2006 well inventory/usability survey by O'Brien & Gere;
- 2006 baseline monitoring event and 2007 well abandonment/rehabilitation by O'Brien & Gere;
- 2007 AGI/1st Quarter LTM Event by O'Brien & Gere;
- 2007 geologic evaluation of the CIC Site by the U.S. Geological Survey;
- 2007 2nd Quarter LTM Event and 2008 slug testing by O'Brien & Gere;
- 2008 3rd Quarter LTM Event by O'Brien & Gere;
- 2008 4th Quarter LTM Event by O'Brien & Gere;
- 2008 5th Quarter LTM Event by O'Brien & Gere;
- 2009 6th LTM Event by O'Brien & Gere;
- 2009 7th LTM Event by O'Brien & Gere;
- 2010 8th LTM Event by CTI;
- 2011 9th LTM Event by CTI; and,
- 2012 10th LTM Event by CTI.

2.4. Nature and Extent of Groundwater Contamination

Groundwater at the CIC Study Area has been sampled over several time periods as noted above. The current understanding of the nature and extent of contamination is based on an evaluation of the 2003 and 2005 through 2012 groundwater monitoring events.

Groundwater remediation goals (RGs) are established in the December 2003 ROD for OU4 as the most conservative value (i.e., the lowest) of the following sets of standards: (1) USEPA's Maximum Contaminant Levels (MCLs); (2) NJDEP's Safe Drinking Water Standards (or MCLs); and (3) NJDEP's Class IIA Groundwater Quality Standards (GWQS).

The overburden and bedrock groundwater is contaminated at the CIC Study Area. The principal sources appear to have been the overlying contaminated soil and/or contaminant residuals from the former septic pit, former process lagoons, and former buried drum areas. It is also possible that a portion of the groundwater contamination may have been attributable to wastewater discharged to the lagoons during CIC operations. The sporadic groundwater contamination in monitoring wells on neighboring properties to the east of the CIC Site primarily appears to originate from the historic routes of surface water drainage from the Site. These sources to groundwater contamination have been removed; with the latest being contaminated soils and source materials as of May 2005.

Sampling results over time have identified exceedances of metals (specifically arsenic), benzene hexachloride (BHC) pesticides, herbicides (specifically dinoseb), VOCs (benzene and chlorinated solvents) and SVOCs. There have been some notable decreases in concentrations from 2003/2005 to

2012, which is an indication that the OU2 soil remedial action is having a beneficial effect on groundwater concentrations. For example, TCE concentrations have decreased in the bedrock monitoring wells located in the northeastern corner of the CIC Site and concentrations of vinyl chloride, a breakdown product of chlorinated VOCs, has fluctuated over time. Concentrations of alpha-BHC and dinoseb in these monitoring wells also tend to fluctuate over time. Based on historical information on soil contamination, significant levels of dinoseb were identified in the southern portion of the CIC Site. Transition monitoring wells QD and FU (located in this area) has shown a relatively constant concentration of dinoseb over time. And finally, the concentration of arsenic in the bedrock monitoring wells has decreased dramatically since 2003.

Historically, the widest variety of contaminants has been detected in the deeper overburden and bedrock wells in the northeastern portion of the Site (where bedrock was encountered at a shallower depth than in other portions of the CIC Study Area). There is also contamination in the southern portion of the CIC Site within the deeper overburden and bedrock aquifers that appears to be specifically related to historic elevated concentrations of herbicides in this area. Sporadic contamination has also been identified to the east of the CIC Site (i.e., Metroplex Corporation and Total TEC portion of the CIC Study Area), which is indicative of historic surface water drainage patterns. It has been determined and concurred to by both USEPA and NJDEP that elevated levels of trichloroethene (TCE) east of the Metroplex Corporation building area (i.e., monitoring well BF-5) are from an unidentified local source, not CIC Site-related, and subsequently, this source is being addressed as a separate issue by the regulatory agencies.

3. Scope of Monitoring Event

This section describes the field investigation procedures, analytical methods, and quality assurance (QA)/quality control (QC) protocols as conducted during the March 2012 LTM Event at the CIC Study Area. Monitoring was conducted in accordance with the October 2009 *Final Long-Term Monitoring Plan* and applicable USEPA and NJDEP regulations and guidance. There were no noted deviations from these controlling documents during the sampling event.

The March 2012 LTM Event was conducted from March 19 through 24, 2012. Groundwater samples were collected from the monitoring wells established as part of the LTM network which consists of the following 17 wells in the CIC Study Area:

- BF-2
- BF-2D
- BF-4
- FU
- GU
- MW-2BR
- MW-2S
- MW-3BR
- MW-3S
- MW-4BR
- MW-4S
- MW-5BR
- MW-6BR
- MW-7BR
- NUS-2D
- NUS-3S
- QD

The current LTM well network is depicted on Figure 2-1.

3.1. Groundwater Level Measurements

On March 19, 2012, CTI collected a synoptic round of water level measurements from all 26 groundwater monitoring wells. During water level measurements, the static water level and total sounded depth of each monitoring well were measured. Water levels were measured using an electronic water level indicator with an accuracy of ±0.01 feet from a consistent point at the top of the inner well casing. Water level and total well depth measurements, and the calculated groundwater elevation based on the surveyed elevation of the inner well casing are presented on Table 3-1. The water level measurement information is presented in Appendix A.

3.2. Monitoring Well Inspection

A well inventory and inspection of the monitoring wells was conducted to evaluate the present condition of each well in the LTM monitoring well network. The USEPA Region 2 Superfund Well Assessment Checklist was completed for each monitoring well. The well inspection identified several deficiencies with the wells, primarily associated with the flush–mount well covers. The well deficiencies, well maintenance performed during the sampling event by field personnel, and recommendations for follow-up maintenance is presented in Table 3-2. The USEPA Well Assessment Checklist Forms are presented in Appendix A.

3.3. Groundwater Sampling

The monitoring wells were purged and sampled in accordance with USEPA Region II's *Ground Water Sampling Procedure – Low Stress (Low Flow) Purging and Sampling* dated March 1998 and as the primary guidance for low flow sampling, NJDEP's *Field Sampling Procedures Manual* (Section 6.9.2.2), dated August 2005. The groundwater sampling was conducted March 20 through 24, 2012.

Initially, the static water level was measured in the monitoring well with an electronic water level indicator. A 1.75" QED Sample Pro™ submersible bladder pump and attached Teflon™-lined polyethylene tubing was carefully lowered to the designated sample depth interval within the well screen (approximate midpoint of screen interval) and secured. When starting the purge process, the groundwater was purged at a rate of approximately 100 milliliters/minute (mL/min) while monitoring drawdown and adjusted according to drawdown. Purge water was discharged to the ground surface.

Field parameters were monitored with a Horiba U-22 flow-through cell. Field parameter measurements of pH, specific conductivity, temperature, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity were recorded at approximate 5-minute intervals during purging. Purging continued until these field parameters stabilized. Groundwater sampling logs are presented in Appendix B.

Upon stabilization of the field parameters, the flow-through cell was disconnected, the purge flow rate was maintained, and a groundwater sample was collected for laboratory analysis. Table 3-3 presents field parameter measurements at the time of sample collection for each monitoring well.

3.3.1. Monitoring Well Performance

Monitoring wells BF-2D, GU, MW-2BR, MW-2S, MW-3BR, MW-3S, MW-6BR, MW-7BR, and NUS-2D were found to recharge at a rate insufficient to support purge rates of approximately 100 ml/min or less and may have excessive drawdown during well purging. When purging, the water level in the monitoring well casing dropped to a level greater than the 0.3' limit specified in the applicable guidance documents. In accordance with the USEPA Region II *Ground Water Sampling Procedure* for wells with insufficient yield, the groundwater purge rate was reduced; the water level was monitored to ensure dewatering of the well below the level of the pump intake did not occur; and the water level was not lowered to a level below the top of the well screen.

To compensate for the low well yield, the well purge rate was reduced. Purging continued until the field parameters became stabilized. Low well yield has been documented during previous investigations. During the AGI, three wells with very low calculated well yields (BF-4, MW-3S, and MW-2BR) were redeveloped suggesting the low well yield is a function of low aquifer hydraulic conductivity rather than well screen and filter pack performance.

Total well depth measurements collected during the March 2012 LTM Event indicated well depth did not change substantially in comparison to the July 2011 LTM Event. Several wells differed by more than 0.15 feet between the July 2011 LTM and the March 2012 LTM. A heavy groundwater tape was utilized during both LTM sample events. The March 2012 well depth measurements and the TOC total depth installed are presented on Table 3-1.

3.4. Analytical Methods

Groundwater samples and associated QC samples were shipped via FedEx or hand delivered to the following laboratories for analysis of the following parameters:

- USEPA - Division of Environmental Science and Assessment (DESA) Laboratory, Edison, New Jersey, provided the analysis of Target Compound List (TCL) volatile organic compounds (VOCs) and the analysis of Target Analyte List (TAL) metals, reporting arsenic only.

- KAP Technologies, Inc. (KAP) of The Woodlands, Texas. KAP provided the analysis of TCL pesticides, reporting for BHC compounds only and herbicides analysis, reporting for dinoseb only from monitoring wells FU and QD only.

Table 3-4 presents a summary of sample preparation and analytical methods utilized during the March 2012 LTM Event. Chain-of-custody records and the CIC Sampling Trip Report for the samples submitted for laboratory analysis are included as Appendix C.

3.5. Quality Assurance/Quality Control

The overall QA/QC objective was to develop and implement procedures for field sampling, chain-of-custody, laboratory analyses, and reporting so that data was collected in a uniform manner, and that data is of consistently high quality. To collect and record data in a uniform manner, the August 2010 *Contractor Quality Control Plan (CTI)* and the March 2011 *Final Quality Assurance Project Plan* were prepared which describe and specify QA/QC procedures for the LTM program.

3.5.1. Equipment Decontamination

To reduce the possibility of cross-contamination, sampling equipment that came in contact with groundwater was decontaminated before each sample was collected. Where possible, disposable items were utilized (i.e., tubing) to reduce the potential for cross-contamination. Equipment was decontaminated near the monitoring well location with the spent solution and rinse water discharged to the ground surface (away from the well location).

3.5.2. Equipment Calibration

The equipment used to monitor the water quality indicator parameters was properly calibrated with reference standards at the start of each day of sampling. Additionally, pH calibration was performed at the end of the day. Equipment calibration information was recorded on calibration logs presented in Appendix D.

3.5.3. Field Quality Control

Field QC samples collected during the March 2012 LTM Event included field duplicates, equipment (rinsate) blanks, trip blanks, and a matrix spike/matrix spike duplicate (MS/MSD). Analytical results for equipment blanks, trip blanks, and field duplicate samples (provided with the actual sample results as sample pairs) are presented in Section 4.0.

Two field duplicate samples were collected as a measure of the precision of the sample collection process and analytical reproducibility. Duplicates were collected at the same time, using the same procedures, the same equipment, and the same type of containers as the parent samples. Field duplicate samples were collected at NUS-3S and QD and labeled as DUP-1 and DUP-2, respectively.

Equipment rinsate samples were collected and analyzed to examine the effectiveness of equipment decontamination procedures. Samples from the submersible pump and tubing were collected daily (5 total) using high-grade deionized water. Equipment (rinsate) blanks were identified as "ER" and the sequence in which they were collected.

Trip blanks were prepared each day and accompanied each cooler with a VOC sample. The trip blanks served as an evaluation of contamination generated from sample containers or contamination occurring during the sample transport and laboratory storage processes. Three trip blanks were submitted (one per VOC sample shipment) and labeled "TB" and the sequence in which they were collected.

One MS/MSD sample was collected at a location not suspected of contamination but representative of different groundwater conditions to confirm the accuracy of the laboratory analysis. The MS/MSD sample was collected from well QD.

3.5.4. Sample Delivery and Custody

FedEx was used as the method of shipment to KAP laboratory and samples were hand delivered to the USEPA-DESA laboratory during this sampling event. All samples were packaged for shipment in accordance with Contract Laboratory Program procedures, Department of Transportation (DOT) requirements, and chain-of-custody procedures.

3.5.5. Field Documentation

Chain-of-custody records, groundwater sampling logs, and equipment calibration logs were used as a means of recording the data collection activities performed each day onsite. Additionally, for each day of sampling, a daily quality control report (DQCR) was completed (see Appendix E).

3.5.6. Field Audits

A field audit of the March 2012 LTM Event was conducted on March 20, 2012 by Jacqueline Frazier, the project chemist representing the USACE-KCD. During the field audit, minor concerns were identified and addressed over the course of the LTM event.

3.5.7. Data Validation

The purpose of validating data is to allow the data user to interpret and use the data with varying degrees of confidence, depending on how the data are qualified (i.e., unqualified, estimated, or rejected). Groundwater samples collected during the March 2012 LTM Event for analysis of metals (arsenic only) and VOCs were submitted to the USEPA-DESA laboratory in Edison, NJ. Groundwater samples collected for analysis of Herbicides (Dinoseb only from monitoring wells FU and GD) and pesticide analysis were submitted to KAP in The Woodlands, Texas. USEPA performed data validation for 100% of the VOC, arsenic, pesticide, and herbicide analytical data. Data validation results and laboratory data are provided in Appendix F.

3.5.8. Electronic Data Deliverable

The analytical data from the March 2012 LTM Event will be submitted electronically to USEPA in the electronic data deliverable (EDD)-required format as part of the submission of this report.

4. Monitoring Results

The purpose of the March 2012 LTM Event was to collect groundwater samples from the LTM well network at the CIC Study Area to monitor contaminant concentrations, evaluate groundwater flow direction, and to continue monitoring the effectiveness of the May 2005 OU2 remedial action.

4.1. Condition of Monitoring Wells

A synoptic round of water level and total depth measurements was collected prior to the sampling event. During these measurements, the condition of each monitoring well was noted and well repairs associated with securing the covers on the flush-mount protective casings and/or well casing locking plugs were performed at several well locations.

4.2. Summary of Hydrogeologic Results

Based on the results of the synoptic round of water level measurements, potentiometric surface (groundwater contour) maps were developed for the overburden and bedrock zones as depicted on Figures 4-1 and 4-2, respectively. Groundwater flow direction in the overburden and bedrock aquifers is generally to the southeast, with a localized northeasterly component in the bedrock aquifer across the CIC Site itself.

The shale bedrock aquifer is isolated from the overburden groundwater across the CIC Study Area by the weathered shale bedrock (saprolite) which acts as semi-confining layer and is not considered an aquifer but rather an aquitard. The vertical hydraulic gradient between the overburden and bedrock aquifers is predominantly downward, typically ranging from 0.0031 to 0.27 ft/ft. Within the bedrock aquifer, vertical hydraulic gradients between deep and shallow bedrock wells tend to be upward, ranging from 0.005 ft/ft at BF-2/BF-2D to 0.014 ft/ft at MW-1BRD/MW-1BRS. In the CIC Study Area, the horizontal gradient is approximately 0.006 feet/feet in the overburden and bedrock aquifers with groundwater flow toward the east and southeast. On the CIC Site, the horizontal gradient is approximately 0.025 feet/feet in the overburden and bedrock aquifers with groundwater flow toward the north and northeast.

4.3. Remediation Goals

Screening criteria (remediation goals (RGs)) were used to assist in the interpretation of the analytical results from the March 2012 LTM Event. This included the most conservative value (i.e., the lowest) of USEPA's MCLs, NJDEP's MCLs, and NJDEP's GWQS. Analytical results for groundwater monitoring wells are presented in Table 4-1 for VOCs, pesticides, herbicides, and metals. Analytical results for equipment rinsate blanks and VOC trip blanks are presented in Table 4-2.

Contaminants of concern (COCs) have been selected for this project based on an evaluation of the various data sets (2003 to 2009). The primary COCs consist of one predominant contaminant compound per analyte group based on historic uses at the CIC Site, detections across the CIC Study Area, and the frequency of concentrations exceeding the established remediation goals. The primary COCs are as follows:

- VOCs – TCE;
- Pesticides – alpha-BHC;
- Herbicides – dinoseb; and
- Metals – arsenic.

Figures 4-3 and 4-4 depict contaminant concentration for the primary COCs and vinyl chloride from 2003 through 2012 for the overburden/transition wells and bedrock wells, respectively.

4.4. Summary of Analytical Results

The laboratory analytical packages are provided in Appendix F.

4.4.1. Volatile Organic Compounds

Groundwater analytical results for VOCs are presented on Table 4-1. Because the remediation goals for this project are low, a lower method detection limit (0.50 µg/L) was requested for VOC analysis.

The following constituents were detected at or above the remediation goals:

Trichloroethene (TCE) [goal of 1 µg/L]
- MW-7BR at 1.0 µg/L; and
- QD/QD (dup.) at 1.4/1.4 µg/L.

1,2-Dichloroethane (1,2-DCA) [goal of 2 µg/L]
- MW-5BR at 6.3 µg/L;
- BF-2 at 8.6 µg/L;
- BF-2D at 11 µg/L; and
- QD/QD (dup.) at 2.1/2.2 µg/L.

1,1-Dichloroethene (1,1-DCE) [goal of 1 µg/L]
- BF-2 at 1.2 µg/L.

Vinyl Chloride [goal of 1 µg/L]
- BF-2 at 8.0 µg/L;
- BF-2D at 63 µg/L; and
- MW-5BR at 76 µg/L.

Benzene [goal of 1 µg/L]
- MW-5BR at 23 µg/L;
- BF-2 at 4.6 µg/L;
- BF-2D at 13 µg/L; and
- QD/QD (dup.) at 1.6/1.6 µg/L.

Monitoring well nest location BF-2, BF-2D, and MW-5BR continues to exhibit the broadest range of VOCs above the established remediation goals in the CIC Study Area. VOCs were also detected above the remediation goals at monitoring well locations MW-7BR and QD.

4.4.2. Pesticides

Groundwater analytical results for BHC compounds are presented on Table 4-1. The following BHC constituents were detected above the remediation goals:

alpha-BHC [goal of 0.02 µg/L]
- MW-5BR at 1.5 µg/L;
- BF-2 at 3.2 µg/L;
- BF-2D at an estimated 3.5 µg/L;
- FU at 0.051J µg/L; and
- QD/QD (dup.) at 0.060/0.047J µg/L.

beta-BHC [goal of 0.04 µg/L]
- MW-5BR at 0.6J µg/L;
- BF-2 at an estimated 0.96 µg/L;
- BF-2D at an estimated 0.68J µg/L; and
- QD at 0.24J µg/L.

gamma-BHC [goal of 0.03 µg/L]
- QD/QD (dup.) at 0.051/0.036J µg/L.

Monitoring well nest location BF-2, BF-2D, MW-5BR, and monitoring well QD exhibit the broadest range of pesticides above the established remediation goals in the CIC Study Area. Pesticides were also detected above the established remediation goals in monitoring well FU during the March 2012 sample event

4.4.3. Herbicides

Groundwater analytical results for dinoseb at monitoring wells FU/DUP and QD are presented on Table 4-1. Dinoseb was not detected above the remediation goal of 7.0 µg/L in either well. Due to high dinoseb concentrations in the past (prior to the OU2 remedial action), this constituent was selected as the primary herbicide COC.

4.4.4. Metals

Groundwater analytical results for arsenic are presented on Table 4-1. It should be noted that the lower method reporting limit of 1.0 µg/L was used during the March 2012 groundwater sample event which is below the arsenic remediation goal of 3 µg/L. A description of the analytical testing is presented in Section 3.4. Exceedances of the 3 µg/L remediation goal were as follows:

- MW-2BR at 3.2 µg/L;
- BF-2 at 370 µg/L;
- BF-2D at 9.5 µg/L;
- MW-5BR at 160 µg/L ;
- MW-6BR at 4.9 µg/L ; and

5. Conclusions and Recommendations

Conclusions

The groundwater flow regime at the CIC Study Area is comprised of an overburden and weathered bedrock (saprolite) groundwater flow system and the bedrock groundwater flow system. Groundwater in the overburden and bedrock aquifers is contaminated at the CIC Study Area with the principal sources being contaminated soil and source materials removed as part of the OU2 remedy and historic surface water drainage patterns from the CIC Site. Based on the data collected from 2003 to date, primary COCs include metals (specifically arsenic), BHC pesticides (specifically alpha-BHC), herbicides (specifically dinoseb), and VOCs. Figures 4-3 and 4-4 depict contaminant concentration for the primary COCs and vinyl chloride from 2003 through 2012 for the overburden/transition wells and bedrock wells, respectively.

In the overburden/saprolite aquifer, groundwater concentrations exceeded the established groundwater remediation goals at monitoring well location QD for Trichloroethene (1.4 µg/L), Benzene (1.6 µg/L), alpha-BHC (0.060 µg/L), beta-BHC (2.4J µg/L), and gamma-BHC (0.051 µg/L) and at monitoring well location FU for alpha-BHC (0.051J µg/L).

No other analytes exceeded the established groundwater remediation goals in the overburden/saprolite aquifer. Monitoring wells QD and FU are located in the central portion of the CIC Study Area. TCE and pesticide concentrations in monitoring well QD tend to fluctuate over time and intermittently exceed the established remediation goals. Pesticide concentrations in monitoring well FU also tend to fluctuate over time near the established remediation goal.

In the bedrock aquifer, groundwater concentrations exceeded the established groundwater remediation goals at six monitoring well locations for the following constituents.

Monitoring Well BF-2

- 8.6 µg/L for 1,2-DCA (RG of 2 µg/L)
- 1.2 µg/L for 1,1-DCE (RG of 1 µg/L)
- 8.0 µg/L for Vinyl Chloride (RG of 1 µg/L)
- 4.6 µg/L for Benzene (RG of 1 µg/L)
- 3.2 µg/L for alpha-BHC (RG of 0.02 µg/L)
- 0.96 µg/L for beta-BHC (RG of 0.04 µg/L)
- 370 µg/L for Arsenic (RG of 3 µg/L)

Monitoring Well BF-2D

- 11 µg/L for 1,2-DCA (RG of 2 µg/L)
- 63 µg/L for Vinyl Chloride (RG of 1 µg/L)
- 13 µg/L for Benzene (RG of 1 µg/L)
- 3.5 µg/L for alpha-BHC (RG of 0.02 µg/L)
- 0.68 J µg/L for beta-BHC (RG of 0.04 µg/L)
- 9.5 µg/L for Arsenic (RG of 3 µg/L)

Monitoring Well MW-5BR

- 6.3 µg/L for 1,2-DCA (RG of 2 µg/L)

- 76 µg/L for Vinyl Chloride (RG of 1 µg/L)
- 23 µg/L for Benzene (RG of 1 µg/L)
- 1.5 µg/L for alpha-BHC (RG of 0.02 µg/L)
- 0.6J µg/L for beta-BHC (RG of 0.04 µg/L)
- 160 µg/L for Arsenic (RG of 3 µg/L)

Monitoring Well MW-2BR
- 3.2 µg/L for Arsenic (RG of 3 µg/L)

Monitoring Well MW-6BR
- 4.9 µg/L for Arsenic (RG of 3 µg/L)

Monitoring Well MW-7BR
- 1.0 µg/L for TCE (RG of 1 µg/L)

No other compounds exceeded the established groundwater remediation goals in the bedrock aquifer.

Monitoring well nest location BF-2, BF-2D, and MW-5BR provides a vertical profile of contaminant concentrations in the northeastern corner of the CIC Site and exhibits the broadest range of contaminants (VOCs, pesticides, and arsenic) above the established remediation goals in the CIC study area. Figure 4-4 depicts contaminant concentration for the primary COCs and vinyl chloride from 2003 through 2012 for the bedrock monitoring wells.

The overall trend of decreasing arsenic concentrations is consistent with previous sampling events at shallow bedrock aquifer monitoring well BF-2 (12,700 µg/L in 2003 to 370 µg/L in 2012) indicating that the OU2 soil remedial action is continuing to have a beneficial effect on the shallow bedrock groundwater arsenic concentrations. Arsenic concentrations appear to fluctuate over time in the deeper sections of the bedrock aquifer. At monitoring well MW-5BR, arsenic concentrations decreased consistently from 2003 to 2011and increased from 135 µg/L in 2011 to 160 µg/L in 2012. At monitoring well location BF-2D arsenic decreased from 25.9 µg/L in 2003 to non-detect during 6th LTM Event in 2009. Arsenic concentrations steadily increased from 16 µg/L in 2010 and decreased to 9.5 µg/L during the March 2012 LTM Event. The fluctuations in arsenic concentration may reflect fluctuations in groundwater elevation and/or changes in the vertical hydraulic groundwater flow gradient within the bedrock aquifer.

From 2011 to 2012, TCE concentrations decreased from 0.88 µg/L to 0.69 µg/L at BF-2 and decreased from 1.6 µg/L to 1.0 µg/L at MW-7BR. Vinyl chloride concentrations increased from 6.4 µg/L to 8.0 µg/L at BF-2, from 66 µg/L to 76 µg/L at MW-5BR, and from 61 µg/L to 63 µg/L at BF-2D. The remaining VOC concentrations remained relatively consistent during the period from 2011 to 2012.

From 2011 to 2012, Alpha-BHC concentrations increased from 1.3J µg/L to 3.5 µg/L at BF-2D, from 1.4 µg/L to 3.2 µg/L at BF-2, and from 0.47 µg/L to 1.5 µg/L at MW-5BR. Beta-BHC concentrations increased from 0.23J µg/L to 0.68J µg/L at BF-2D, from 0.46J µg/L to 0.96 µg/L at BF-2, and from 0.12 µg/L to 0.60J µg/L at MW-5BR. Historical analytical laboratory results for Dinoseb in monitoring well BF-2 indicates concentration had decreased from 24 µg/L in 2003 to non-detect in 2008.

Anticipated upcoming activities for the CIC Study Area include the following sampling events:

- 4th Quarter 2012 LTM Event to be conducted in December 2012; and
- 3rd Quarter 2013 LTM Event to be conducted in September 2013.

An LTM Report will be prepared after each sampling event.

Recommendations

A re-evaluation each year (after each LTM event) is required to assess whether changes to the LTM program are required. Currently, there are no recommended changes to the sampling program, nor is there any indication that any existing monitoring wells should be abandoned.

The following recommendations will improve the CIC field data collection methods and ensure the integrity of the groundwater monitoring well network:

- Direct measure total well depth using a heavy line weight and fiberglass survey tape to accurately measure well depth and evaluate the accumulation of sediment at the bottom of the well.
- Perform additional monitoring well maintenance as outline in Table 3-2 Monitoring Well Inspection, as appropriate.
- Monitor the performance of NUS-3S due to the identification of a crack in the well screen. Based on groundwater flow direction, this is an upgradient monitoring well installed to a depth of 16 feet. Review of the laboratory analytical results (Figure 4-3 and Table 4-1) indicates this well has not been impacted by on-site contaminants and had very low concentration detects of arsenic in 2007. Based on the upgradient groundwater flow location and non-detect status, NUS-3S can remain "as is" in the monitoring network until the growth of roots or the collection of sediment cause sufficient blockage to render the well unusable.

6. References

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USEPA Region II's *Ground Water Sampling Procedure – Low Stress (Low Flow) Purging and Sampling* dated March 1998.

NJDEP's *Field Sampling Procedures Manual (Section 6.9.2.2) dated August 2005.*

Tables

Ta[illegible]1
Groundwater Level Measurements
March 2012 Sample Event
Chemical Insecticide Corporation
Edison Township, Middlesex County, New Jersey
Operable Unit 4 (OU4) - Groundwater

Well ID	Aquifer	Depth to Water March 19, 2012	Groundwater Elevation March 19, 2012	Total Depth March 19, 2012	Top of Inner Casing Elevation	Ground Surface Elevation	Total Depth Installed (feet bgs)	Difference Between TOC/Ground Surface	Total Depth Installed (feet TOC)	Screen Interval (feet bgs)		Northing Coordinate	Easting Coordinate
										Top	Bottom		
BF-2	Bedrock	9.55	95.77	33.93	105.32	104.52	34.5	0.80	35.30	24.5	34.5	617318.0	529088.8
BF-2D	Bedrock	13.42	96.06	91.34	109.48	108.18	90	1.30	91.30	80	90	617366.4	529046.4
BF-4	Bedrock	0.17	93.85	85.00	94.02	93.67	85.4	0.35	85.75	75.4	85.4	617180.5	529619.1
BF-5	Bedrock	9.73	85.58	35.00	95.31	94.95	35.35	0.36	35.71	25.35	35.35	616806.0	530061.2
FU	Overburden	4.52	91.09	13.58	95.61	95.06	15	0.55	15.55	5	15	616815.4	529626.8
GU	Overburden	3.88	91.37	35.33	95.25	94.70	36	0.55	36.55	26	36	617084.7	529627.5
MW-1BRD	Bedrock	15.58	95.56	99.35	111.14	110.69	100	0.45	100.45	90	100	617758.6	528988.7
MW-1BRS	Bedrock	16.62	94.77	44.80	111.39	111.09	45	0.30	45.30	35	45	617750.9	528979.4
MW-1S	Transition	8.2	103.19	16.40	111.39	110.77	17	0.62	17.62	7	17	617736.1	528959.6
MW-2BR	Bedrock	6	98.48	88.62	104.48	104.16	90	0.32	90.32	80	90	617522.1	529713.2
MW-2I	Transition	6.33	98.41	35.44	104.74	104.49	35	0.25	35.25	25	35	617510.3	529700.4
MW-2S	Overburden	5.65	99.11	13.30	104.76	104.46	14	0.30	14.30	4	14	617515.4	529705.0
MW-3BR	Bedrock	3.71	84.14	40.13	87.85	86.40	38	1.45	39.45	28	38	616365.4	531000.7
MW-3S	Transition	4.59	83.81	15.74	88.40	85.50	14	2.90	16.90	4	14	616342.9	531004.3
MW-4BR	Bedrock	23.41	93.87	60.00	117.28	115.93	58	1.35	59.35	48	58	617588.6	528348.2
MW-4S	Overburden	13.26	105.03	15.84	118.29	115.69	17	2.60	19.60	7	17	617603.2	528341.8
MW-5BR	Bedrock	8.68	95.99	63.45	104.67	104.22	63	0.45	63.45	53	63	617340.0	529113.9
MW-6BR	Bedrock	13.42	95.27	78.92	108.69	108.14	79	0.55	79.55	63	79	617054.4	529064.2
MW-7BR	Bedrock	4.8	91.00	44.10	95.80	95.35	44	0.45	44.45	34	44	616812.9	529631.5
MW-8BR	Bedrock	15.38	89.91	63.12	105.29	104.84	63	0.45	63.45	53	63	616453.3	530010.9
NUS-2D	Bedrock	17.11	99.33	109.95	116.44	115.92	105	0.52	105.52	89	105	616745.8	528866.2
NUS-3D	Bedrock	9.22	110.80	40.00	120.02	119.40	43	0.62	43.62	25	43	616683.5	528591.5
NUS-3S	Overburden	9.85	110.79	16.00	120.64	120.29	14	0.35	14.35	4	14	616681.0	528598.9
OU	Overburden	4.1	90.60	7.88	94.70	94.40	8.5	0.30	8.80	3.5	8.5	616797.4	530059.1
QD	Transition	19.21	91.72	47.56	110.93	110.68	48	0.25	48.25	38	48	616751.9	529370.6
UU	Overburden	7.29	88.44	18.90	95.73	93.93	18	1.80	19.80	8	18	616309.5	530363.2

Notes:
bgs = below ground surface
Depth to water and total well depth measured from top of inner casing (TOC) and are provided in feet.
Elevations are in NAVD1988 Datum.
Survey information is from work conducted by Kupper Associates as part of the additional groundwater investigation/1st Qtr LTM activities.
Overburden = Geologic Unit I (fill material) and II (fluvio-glacial deposits) from previous remedial investigation activities.
Transition = Geologic Unit III (slightly weathered zone/clay and silt) from previous remedial investigation activitie
Bedrock = Geologic Unit IV (consolidated Brunswick shale) from previous remedial investigation activities.
"Total Depth Installed" and "Screen Interval" data are based on available information including boring logs, well construction logs, and NJDEP well records. Subsequently, measurments may not be completely accurate since the work was conducted by other contractors.

Table 3-2
Monitoring Well Inspection
March 2012 Sample Event
Chemical Insecticide Corporation
Edison Township, Middlesex County, New Jersey
Operable Unit 4 (OU4) - Groundwater

Well Number	Well Deficiency	Well Maintenance Performed	Recommendations
BF-4	The bolts and threaded holes which secure the steel lid to the flush mount protective casing were found to be	Installed new bolts but do not tighten adequately.	The bolt holes need to be re-drilled and tapped to accommodate larger bolts.
MW-7 BR	Broken tab on flushmount cover	None	Well cannot be secured due to broken cover tab, bolt hole are stripped and need to be retapped.
FU	Weel haed J-plug not secure	Modified J-plug to repair rubber seal and to provide better well seal.	Replace J-plug.
OU	Well casing J-plug in smaller than required to adequately seal well casing.	None	Order correct size well plug and replace during next sample event.
NUS-3S	Roots present in the well screen interval.	CTI utilized a down well camera during a previous sample event to determine the origin of the roots. CTI identified a break in the well screen at a depth of 9.4' below TOC.	Well screen is comprimised and could be replaced.

Ta[illegible]-3
Field Parameter Measurements
March 2012 Sample Event
Chemical Insecticide Corporation
Edison Township, Middlesex County, New Jersey
Operable Unit 4 (OU4) - Groundwater

Well Number	Well Diameter (inches)	Date	Sample Time (24-hour)	Amount Purged (Liters)	Purge Flow Rate (mL/min)	pH	Temperature (°C)	Conductivity (µmhos/cm)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Water Level (feet below TOC)	Comments
BF-2	5 3/8	3/24/2012	1107	11.25	225	6.33	13.55	525	0.0	-58	0.06	9.77	
BF-2D	2	3/23/2012	1540	9.0	100	6.59	14.76	593	178	-92	0.00	13.45	Pink colored water
BF-4	4	3/23/2012	1240	4.2	125	7.54	17.5	512	1.2	-116	0.00	0.6	
FU	5 3/8	3/22/2012	1300	5.6	225	4.91	13.58	355	0.0	228	0.00	4.55	
FU (resample)	5 3/8	3/23/2012	1040	4.0	200	5.25	14.05	366	0.0	224	0.00	4.55	
GU	4	3/23/2012	1238	4.5	100	6.91	15.72	1510	0.4	17	0.45	4.92	excessive drawdown
MW-2BR	2	3/20/2012	1512	4.2	60	8.33	16.73	463	197	90	3.65	6.26	excessive drawdown
MW-2S	2	3/20/2012	1450	3.6	80	6.69	11.63	830	41.3	122	0.00	6.22	excessive drawdown
MW-3BR	2	3/20/2012	1135	9.0	90	7.26	13.61	293	33.6	-61	0.46	3.99	
MW-3S	2	3/20/2012	1055	9.0	100	4.13	14.00	1450	20.7	382	0.38	5.93	excessive drawdown
MW-4BR	2	3/21/2012	1130	22.5	250	6.32	14.87	527	31.9	-41	0.15	23.57	
MW-4S	2	3/21/2012	1215	3.75	125	6.33	14.92	584	27.5	200	0.00	13.40	
MW-5BR	2	3/23/2012	1523	17.5	250	6.76	13.85	681	0.7	-92	0.23	8.91	
MW-6BR	2	3/24/2012	1135	8.0	100	7.65	13.24	291	35.7	-58	0.00	15.30	excessive drawdown
MW-7BR	2	3/22/2012	1135	3.0	100	7.04	14.48	599	4.1	102	1.2	5.23	
NUS-2D	6	3/21/2012	1355	1.4	50	7.43	15.04	317	19.6	-88	1.94	17.30	
NUS-3S	6 1/2	3/21/2012	1020	16.0	200	4.96	10.88	117	5.2	279	3.90	9.85	
QD	4	3/22/2012	1317	36	400	6.35	14.39	679	8.6	38	0.14	19.45	

Notes:

mL/min = milliliters per minute
PID = photoionization detector
ppm = parts per million
TOC = top of casing
(µmhos/cm) = micromhos per centimeter
NTU = nephelometric turbidity units
NM = not measured
°C = degrees Celsius
mV = millivolts
mg/L = milligrams per liter

Table 3-4
Sample Preparation and Analytical Methods
March 2012 Sample Event
Chemical Insecticide Corporation
Edison Township, Middlesex County, New Jersey
Operable Unit 4 (OU4) - Groundwater

Matrix	Analytical Group	Concentration Level	Analytical Method	Sample Volume and Container	Preservation Requirements	Maximum Holding Time
Groundwater	TCL VOCs	Trace	USEPA SOP DW-1 (GC/MS Method)	3-40mL VOA vials with Teflon-lined septum caps	4 degrees C, HCL to pH<2	14 days from collection for analysis
Groundwater	TCL Pesticides	Trace	USEPA SOP C-91 (GC/ECD Method)	2-1 L amber glass container with Teflon-lined screw cap	4 degrees C	7 days from collection to extraction; 40 days from extraction to analysis
Groundwater	Herbicides	Trace	USEPA Method 3510C8151A	2-1 L amber glass container with Teflon-lined screw cap	4 degrees C	7 days from collection to extraction; 40 days from extraction to analysis
Groundwater	TAL Metals	Low	USEPA SOP C-109 (ICP-AES Method)	1-500 mL polyethylene container	4 degrees C, HNO3 to pH<2	180 days from collection for analysis

Notes:
HCL = hydrochloric acid
HNO3 = nitric acid
L = liter
mL = millileter
TAL = Target Analyte List
TCL = Target Compound List
SOP = Standard Operating Procedure
USEPA = U.S. Environmental Protection Agency
VOCs = volatile organic compounds

Table 4-1
Groundwater Laboratory Analytical Results - March 2012 Sample Event
Chemical Insecticide Corporation - Edison Township, Middlesex County, New Jersey
Operable Unit 4 (OU4) - Groundwater

Well Location	Remediation Goal	MW-2S	MW-2BR	MW-3S	MW-3BR	MW-4S	MW-4BR	MW-5BR	MW-6BR	MW-7BR	BF-2	BF-2D	BF-4	NUS-2D	NUS-3S	NUS-3S DUP	FU	GU	QD	QD DUP
Sample Date		3/20/2012	3/20/2012	3/20/2012	3/20/2012	3/21/2012	3/21/2012	3/23/2012	3/24/2012	3/22/2012	3/24/2012	3/23/2012	3/23/2012	3/21/2012	3/21/2012	3/21/2012	3/22/2012	3/23/2012	3/22/2012	3/22/2012
Well Placement		Overburden	Bedrock	Transition	Bedrock	Overburden	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Overburden	Overburden	Overburden	Overburden	Transition	Transition
Units	(ug/L)	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Volatile Organic Compounds																				
Acetone	6000	10 U	10 U	10 U	10 U	10 U	10 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.4	10 U	10 U	10 U	10 U	5.0 U	10 U	10 U
Benzene	1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	***23***	0.50 U	0.50 U	***4.6***	***13***	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	***1.6***	***1.6***
Bromochloromethane	100*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromodichloromethane	1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	4	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane	10*	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.50 U	0.50 U	1.0 UL	0.50 U	0.50 U	0.50 U	1.0 U	1.0 U	1.0 U	1.0 UL	0.50 U	1.0 UL	1.0 UL
2-Butanone	300*	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon Disulfide	700	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	22	0.50 U	0.50 U	23	23	0.50 U	0.50 U	0.50 U	0.50 U	0.26 U	0.50 U	1.8	1.9
Chloroethane	100*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform	70	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane	100*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Cyclohexane	100*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromochloromethane	1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromo-3-chloropropane	0.02	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.50 U	0.50 U	1.0 U	0.50 U	0.50 U	0.50 U	1.0 U	1.0 U	1.0 U	1.0 U	0.50 U	1.0 U	1.0 U
1,2-Dibromoethane	0.03*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	600	0.50 U	0.50 U	0.50 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.55	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	75	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	2.2	0.50 U	0.50 U	2.0	2.7	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	2.8	2.8
1,2-Dichlorobenzene	600	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.7	0.50 U	0.50 U	2.8	3.0	0.50 U	0.50 U	0.50 U	0.50 U	2.2	0.50 U	18	17
cis-1,2-Dichloroethene	70	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	11	0.86	0.50 U	42	37	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.62	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	***1.2***	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	2	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	***6.3***	1.1	0.50 U	***8.6***	***11***	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	***2.1***	***2.2***
Dichlorodifluoromethane	1000	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	2.5	2.5
cis-1,3-Dichloropropene	1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	100	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	12	0.50 U	0.50 U	11	23	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	700	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Hexanone	100*	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Isopropylbenzene	700*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	2.4	0.50 U	0.50 U	1.1	1.2	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Methyl acetate	7000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.50 U	0.50 U	1.0 U	0.50 U	0.50 U	0.50 U	1.0 U	1.0 U	1.0 U	1.0 U	0.50 UL	1.0 U	1.0 U
Methylcyclohexane	100*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Methylene chloride	3	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-Methyl-2-pentanone	100*	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl tert-butyl ether	70	0.50 U	0.50 U	0.50 U	0.50 U	1.0	0.66	44 K	0.50 U	1.2	11 K	30 K	0.52 K	0.50 U	0.50 U	0.50 U	33	0.50 U	0.50 U	0.50 U
Styrene	100	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.69	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	600	0.50 U	0.50 U	0.81	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	9	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichlorobenzene	100*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	***1.0***	0.69	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	***1.4***	***1.4***
1,1,1-Trichloroethane	30	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	3	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 UJ	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane	2000	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloro-1,2,2-trifluoroethane	100*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.16 J	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	1000	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
m,p-Xylene	1000	0.50 U	0.50 U	0.51	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Vinyl chloride	1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	***76***	0.50 U	0.50 U	***8.0***	***63***	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Metals																				
Arsenic	3.0	1.0 U	***3.2***	2.9	1.9	1.0 U	2.4	***160***	***4.9***	1.0 U	***370***	***9.5***	1.0 U	2.5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pesticides																				
alpha-BHC	0.02	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	***1.5***	0.050 U	0.050 U	***3.2***	***3.6***	0.050 U	0.050 U	0.050 U	0.050 U	***0.051 J***	0.050 U	***0.060***	***0.047 J***
beta-BHC	0.04	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	***0.8 J***	0.050 U	0.050 U	***0.96***	***0.68 J***	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	***0.24 J***	0.011
delta-BHC	100	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	2.8	0.050 U	0.050 U	4.2	4.6	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
gamma-BHC (Lindane)	0.03	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	***0.051***	***0.038 J***
Herbicides																				
Dinoseb	7																1.1		6.2 J	3.4 J

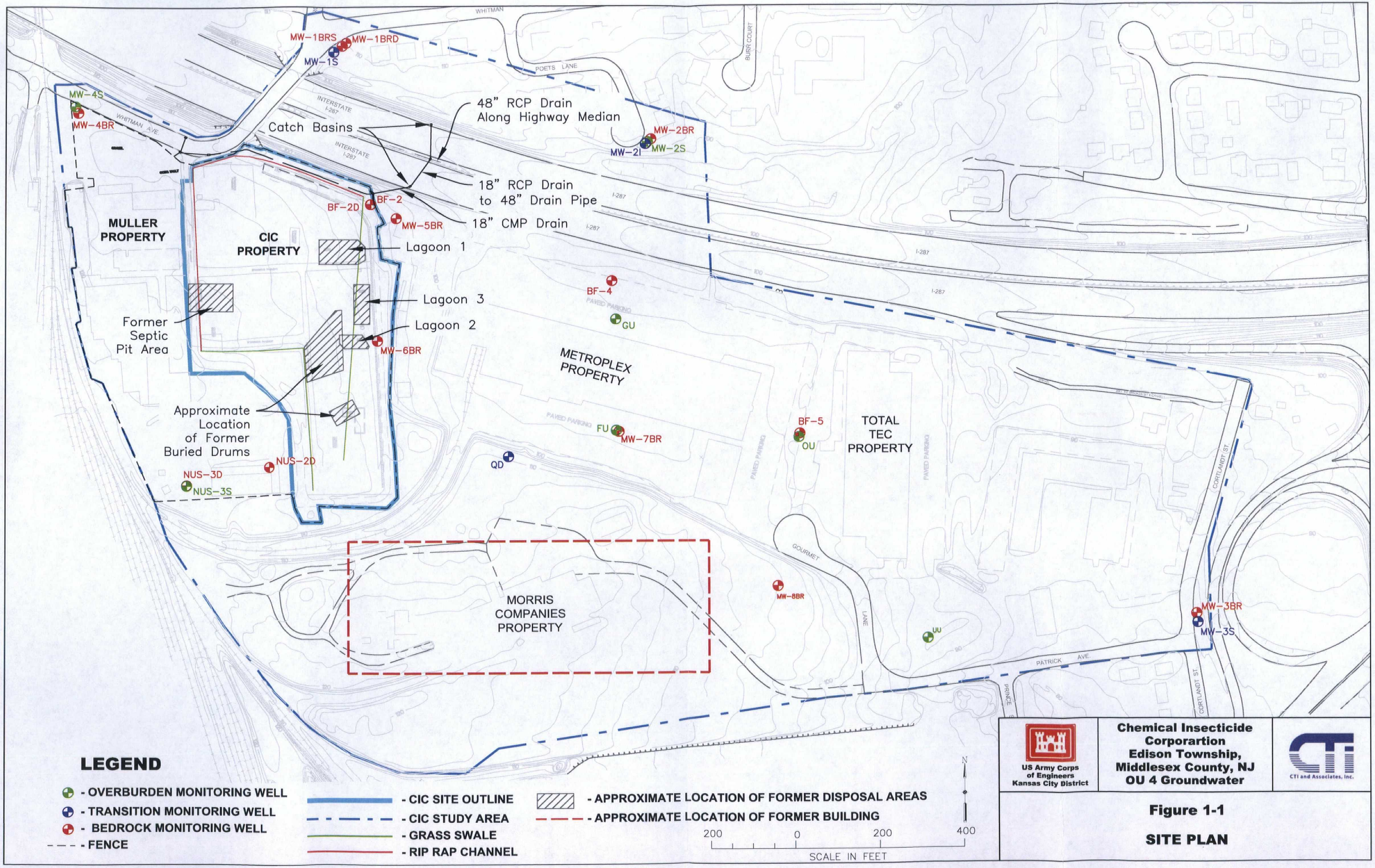
Notes: Bold italizes font denotes compound exceeding remediation goal. Remediation goals from NJDEP's Class IIA Groundwater Quality Standards (GWQS). * denotes RGs from 4th Quarter Long-Term Monitoring Event Report, HDR/OBG May, 2010.
U - Not detected above reported quantitation limit, J - Value estimated, R - Value rejected, K - Value may be biased high, L - Value may be biased low.

Table 4-2
QA Sample Laboratory Analytical Results - March 2012 Sample Event
Chemical Insecticide Corporation - Edison Township, Middlesex County, New Jersey
Operable Unit 4 (OU4) - Groundwater

Well Location	ER-1	ER-2	ER-3	ER-4	ER-5	TB-1	TB-2	TB-3
Sample Date	3/20/2012	3/21/2012	3/22/2012	3/23/2012	3/24/2012	3/20/2012	3/22/2012	3/23/2012
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Volatile Organic Compounds								
Acetone	10 U	25	10 U	7.8	100	87	220	150
Benzene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromochloromethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromodichloromethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane	1.0 U	1.0 U	1.0 UL	1.0 U	1.0 U	1.0 U	1.0 UL	1.0 U
2-Butanone	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon Disulfide	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Cyclohexane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromochloromethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromo-3-chloropropane	1.0 U	1.0 U	1.0 U	1.0 UL	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Hexanone	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Isopropylbenzene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Methyl acetate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylcyclohexane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Methylene chloride	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-Methyl-2-pentanone	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl tert-butyl ether	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Styrene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	0.50 U	0.70	0.66	0.78	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichlorobenzene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1-Trichloroethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
m,p-Xylene	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Vinyl chloride	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Metals								
Arsenic	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			
Pesticides								
alpha-BHC	0.050 U	0.050 U	0.064	0.050 U	0.050 U			
beta-BHC	0.050 U	0.050 U	0.15 NJ	0.050 U	0.050 U			
delta-BHC	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U			
gamma-BHC (Lindane)	0.050 U	0.050 U	0.060	0.050 U	0.050 U			
Herbicides								
Dinoseb				0.25 U				

Notes:
U - Not detected abovereported quantitation limit, J - Value estimated, L - Value may be biased low, NJ - Presumtive evidence analyte is present.

Figures


MW-1BRS
MW-1BRD
MW-1S
MW-4S
MW-4BR
WHITMAN AVE
WHITMAN
POETS LANE
BURR COURT
INTERSTATE I-287
48" RCP Drain Along Highway Median
Catch Basins
18" RCP Drain to 48" Drain Pipe
18" CMP Drain
MW-2BR
MW-2I
MW-2S
BF-2D
BF-2
MW-5BR
MULLER PROPERTY
CIC PROPERTY
Lagoon 1
Lagoon 3
Lagoon 2
Former Septic Pit Area
MW-6BR
BF-4
GU
METROPLEX PROPERTY
Approximate Location of Former Buried Drums
FU
MW-7BR
BF-5
OU
TOTAL TEC PROPERTY
QD
NUS-2D
NUS-3D
NUS-3S
CORTLANDT ST.
GOURMET LANE
MW-8BR
MORRIS COMPANIES PROPERTY
MW-3BR
MW-3S
UU
PATRICK AVE.
PRINCE
LEGEND
- OVERBURDEN MONITORING WELL
- TRANSITION MONITORING WELL
- BEDROCK MONITORING WELL
- FENCE
- CIC SITE OUTLINE
- CIC STUDY AREA
- GRASS SWALE
- RIP RAP CHANNEL
- APPROXIMATE LOCATION OF FORMER DISPOSAL AREAS
- APPROXIMATE LOCATION OF FORMER BUILDING
200 0 200 400
SCALE IN FEET
N
US Army Corps of Engineers Kansas City District
Chemical Insecticide Corporartion
Edison Township, Middlesex County, NJ
OU 4 Groundwater
CTI and Associates, Inc.
Figure 1-1
SITE PLAN

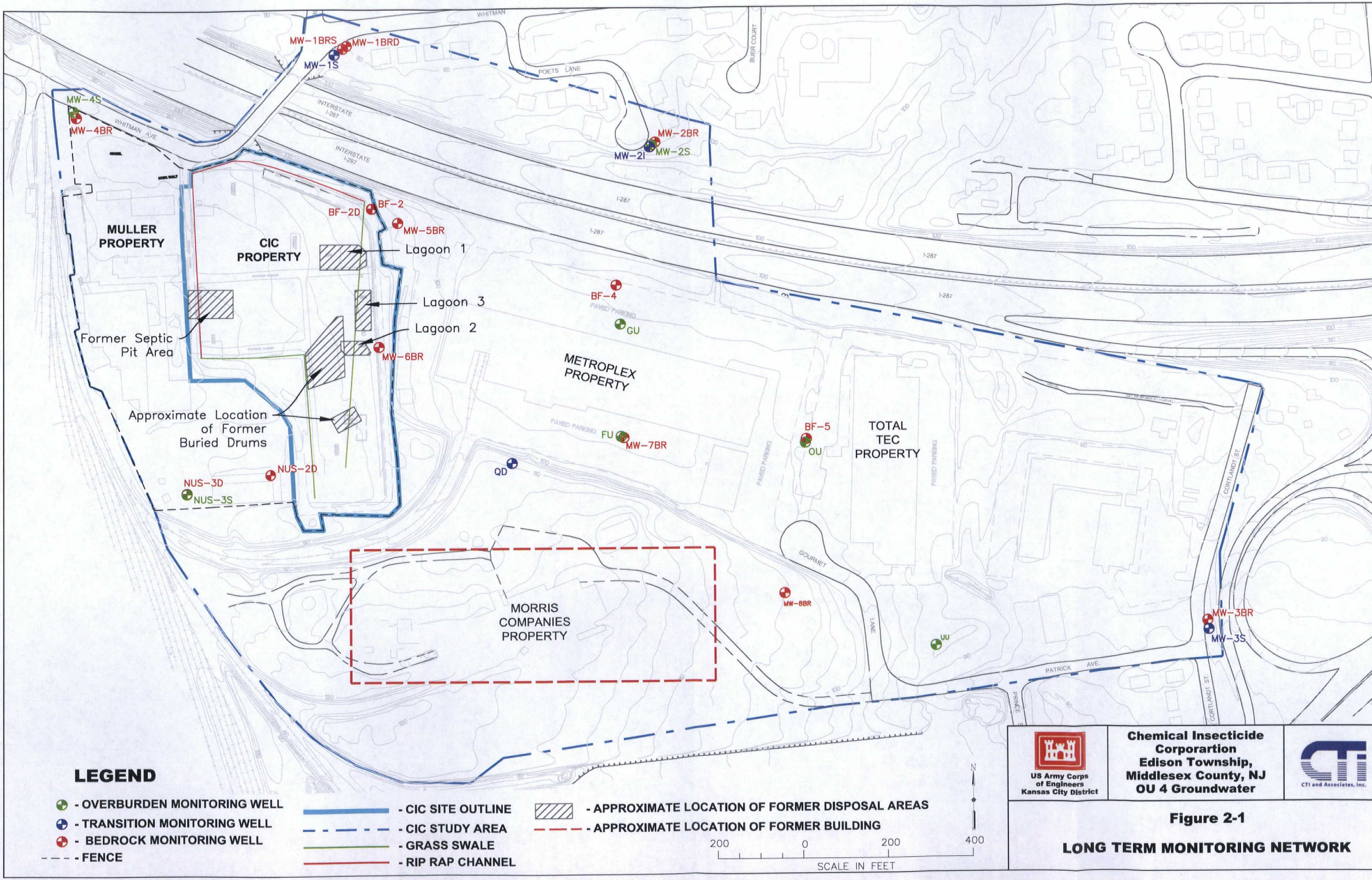
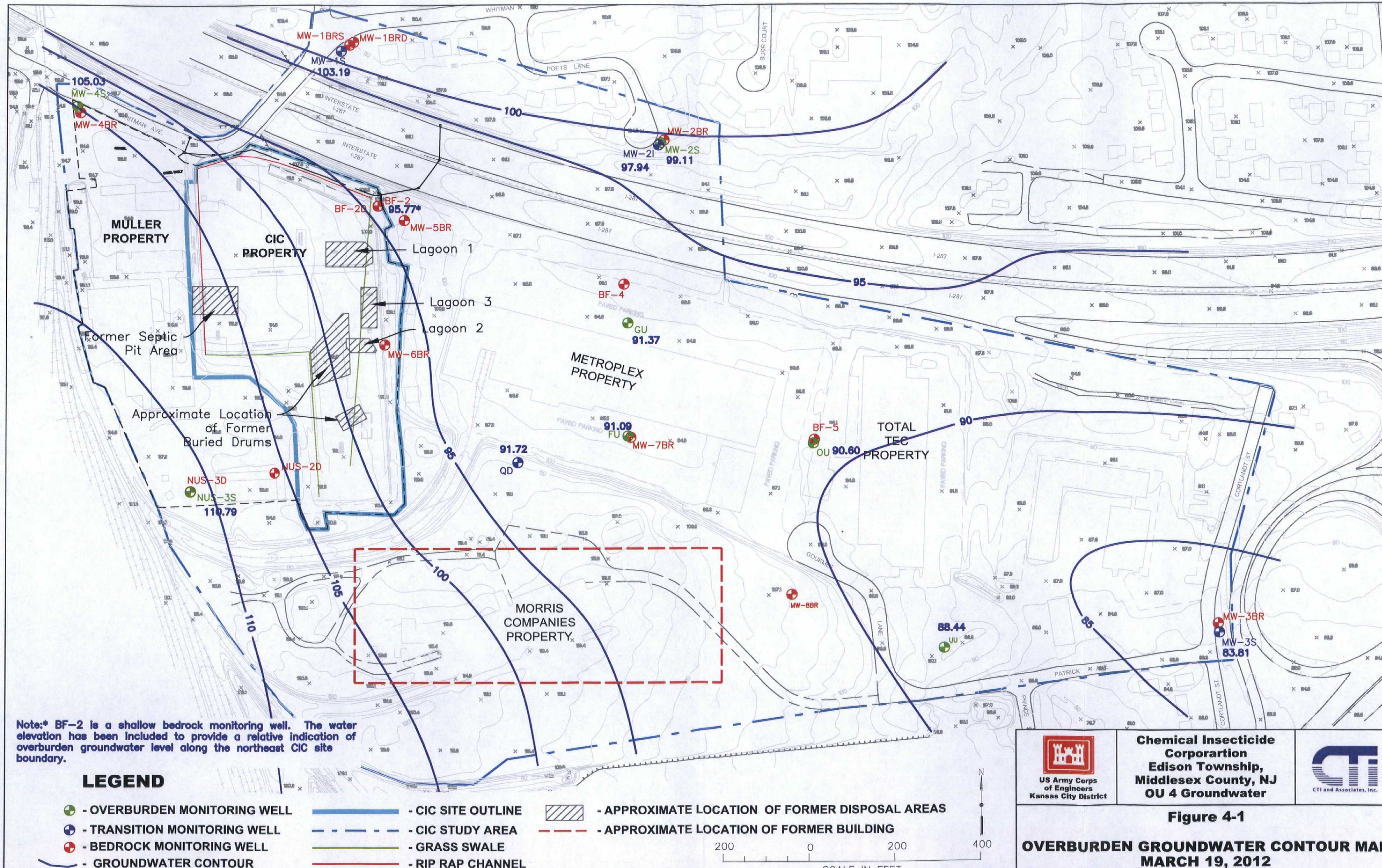
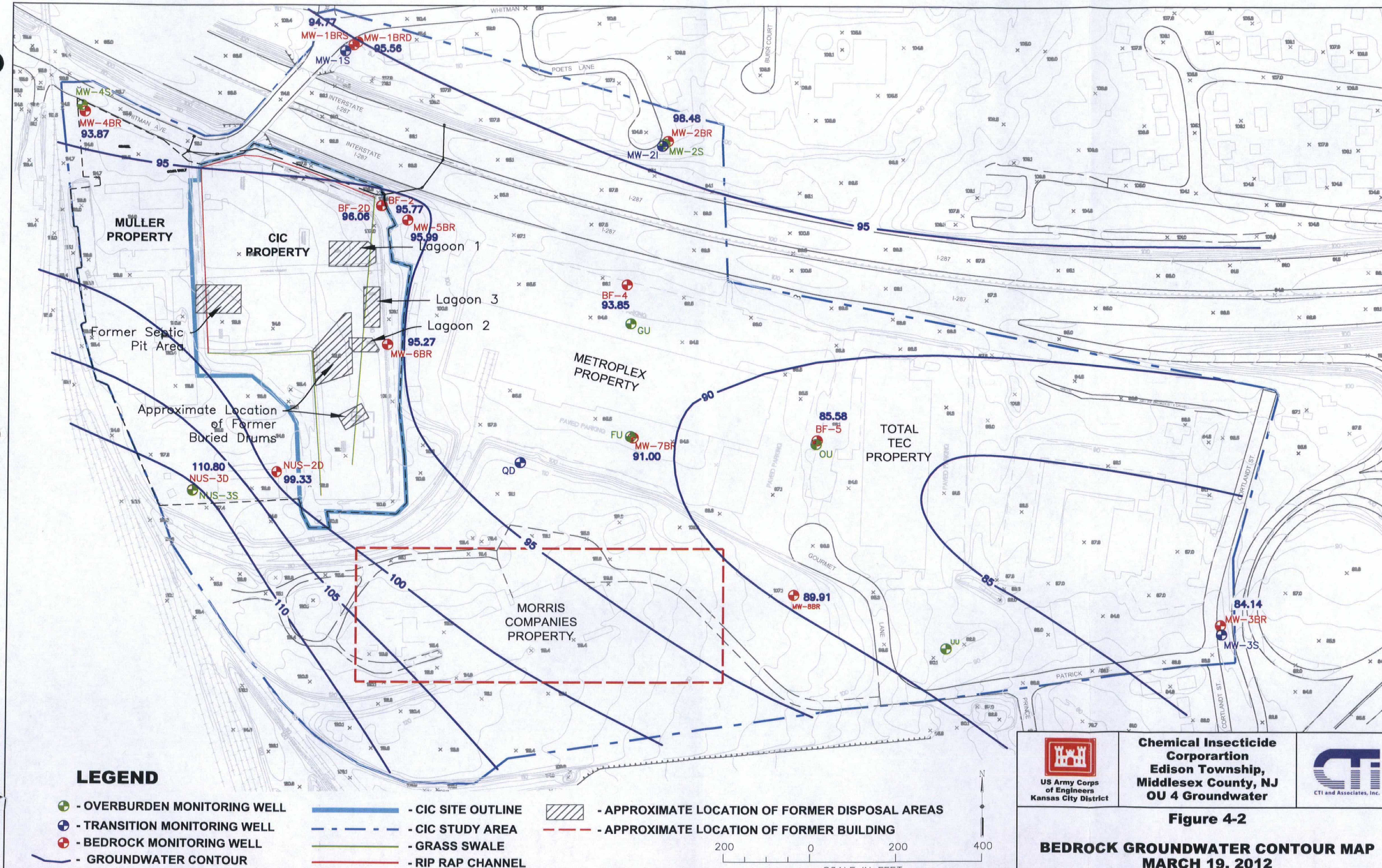


Figure 2-1

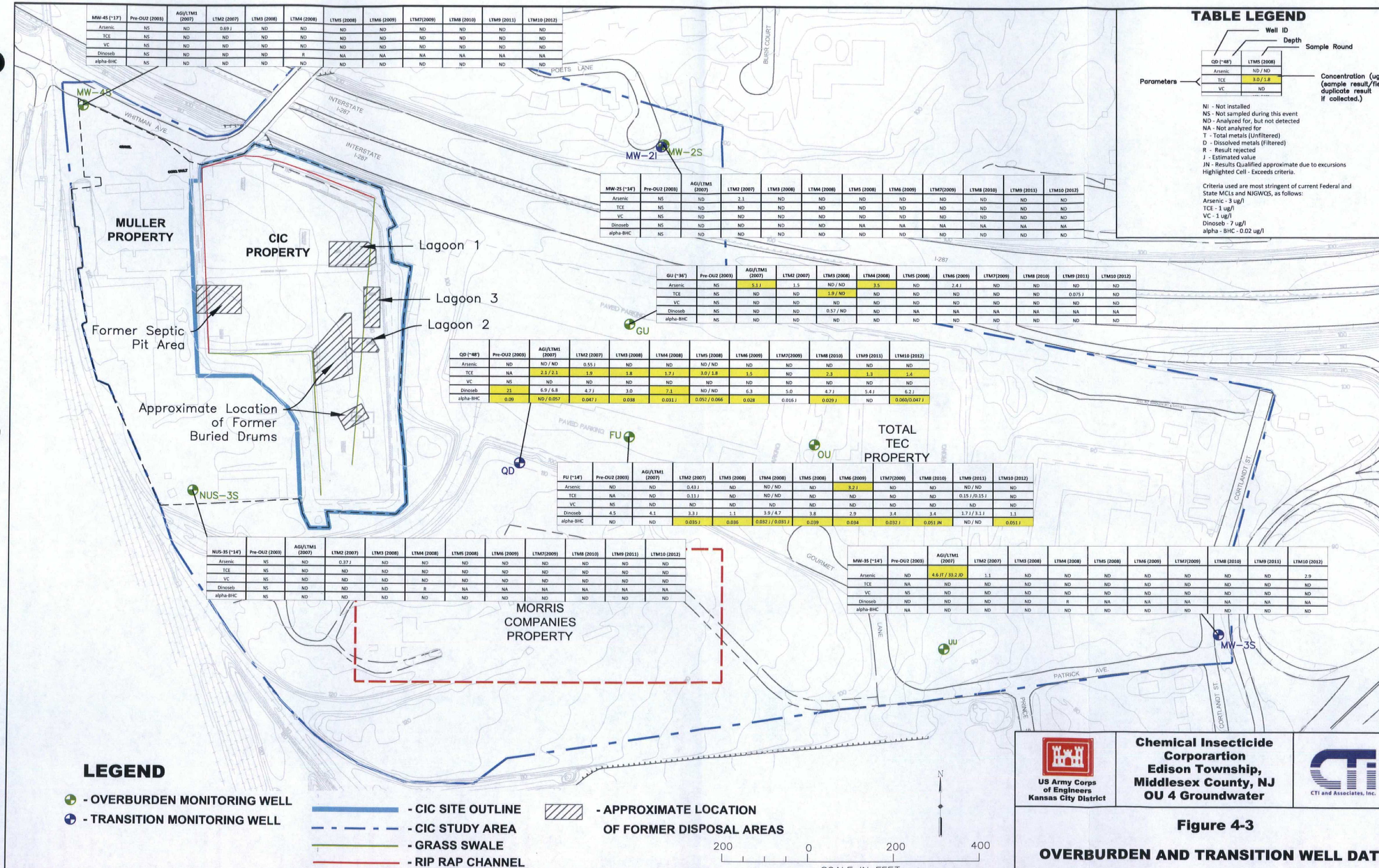
LONG TERM MONITORING NETWORK



MW-1BRS
MW-1BRD
MW-1S
103.19
105.03
MW-4S
MW-4BR
WHITMAN AVE
INTERSTATE I-287
POETS LANE
BUSR COURT
WHITMAN
100
MW-2BR
MW-2I
MW-2S
97.94
99.11
MULLER PROPERTY
CIC PROPERTY
BF-2D
BF-2
95.77*
MW-5BR
Lagoon 1
Lagoon 3
Lagoon 2
Former Septic Pit Area
MW-6BR
BF-4
GU
91.37
95
METROPLEX PROPERTY
Approximate Location of Former Buried Drums
91.72
QD
91.09
FU
MW-7BR
85
BF-5
OU
90.60
TOTAL TEC PROPERTY
90
NUS-3D
NUS-3S
110.79
NUS-2D
100
105
110
MORRIS COMPANIES PROPERTY
MW-8BR
88.44
UU
MW-3BR
MW-3S
83.81
85
CORTLANDT ST
PATRICK
PRINCE
LANE
Note:* BF-2 is a shallow bedrock monitoring well. The water elevation has been included to provide a relative indication of overburden groundwater level along the northeast CIC site boundary.
LEGEND
- OVERBURDEN MONITORING WELL
- TRANSITION MONITORING WELL
- BEDROCK MONITORING WELL
- GROUNDWATER CONTOUR
- CIC SITE OUTLINE
- CIC STUDY AREA
- GRASS SWALE
- RIP RAP CHANNEL
- APPROXIMATE LOCATION OF FORMER DISPOSAL AREAS
- APPROXIMATE LOCATION OF FORMER BUILDING
200 0 200 400
SCALE IN FEET
N
US Army Corps of Engineers Kansas City District
Chemical Insecticide Corporartion
Edison Township, Middlesex County, NJ
OU 4 Groundwater
CTI and Associates, Inc.
Figure 4-1
OVERBURDEN GROUNDWATER CONTOUR MAP
MARCH 19, 2012



MW-1BRS
94.77
MW-1BRD
95.56
MW-1S
MW-4S
MW-4BR
93.87
95
WHITMAN AVE
INTERSTATE I-287
POETS LANE
BURR COURT
98.48
MW-2BR
MW-2I
MW-2S
MULLER PROPERTY
CIC PROPERTY
BF-2D
96.06
BF-2
95.77
MW-5BR
95.99
Lagoon 1
Lagoon 3
Lagoon 2
95.27
MW-6BR
Former Septic Pit Area
Approximate Location of Former Buried Drums
BF-4
93.85
GU
METROPLEX PROPERTY
90
85.58
BF-5
OU
TOTAL TEC PROPERTY
FU
MW-7BR
91.00
QD
110.80
NUS-3D
NUS-3S
NUS-2D
99.33
95
100
105
110
MORRIS COMPANIES PROPERTY
89.91
MW-8BR
85
UU
84.14
MW-3BR
MW-3S
GOURMET
LANE
PATRICK
PRINCE
CORTLANDT ST.
LEGEND
- OVERBURDEN MONITORING WELL
- TRANSITION MONITORING WELL
- BEDROCK MONITORING WELL
- GROUNDWATER CONTOUR
- CIC SITE OUTLINE
- CIC STUDY AREA
- GRASS SWALE
- RIP RAP CHANNEL
- APPROXIMATE LOCATION OF FORMER DISPOSAL AREAS
- APPROXIMATE LOCATION OF FORMER BUILDING
N
200 0 200 400
SCALE IN FEET
US Army Corps of Engineers Kansas City District
Chemical Insecticide Corporartion
Edison Township, Middlesex County, NJ
OU 4 Groundwater
CTI and Associates, Inc.
Figure 4-2
BEDROCK GROUNDWATER CONTOUR MAP
MARCH 19, 2012



MW-4S (~17')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	NS	ND	0.69 J	ND	ND	ND	ND	ND	ND	ND	ND
TCE	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
VC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	NS	ND	ND	ND	R	NA	NA	NA	NA	NA	NA
alpha-BHC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

MW-2S (~14')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	NS	ND	2.1	ND	ND	ND	ND	ND	ND	ND	ND
TCE	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
VC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	NS	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
alpha-BHC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

GU (~36')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	NS	5.1 J	1.5	ND / ND	3.5	ND	2.4 J	ND	ND	ND	ND
TCE	NS	ND	ND	1.9 / ND	ND	ND	ND	ND	ND	0.075 J	ND
VC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	NS	ND	ND	0.57 / ND	ND	NA	NA	NA	NA	NA	NA
alpha-BHC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

QD (~48')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	ND	ND / ND	0.55 J	ND	ND	ND / ND	ND	ND	ND	ND	ND
TCE	NA	2.1 / 2.1	1.9	1.8	1.7 J	3.0 / 1.8	1.5	ND	2.3	1.3	1.4
VC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	21	6.9 / 6.8	4.7 J	3.0	7.1	ND / ND	6.3	5.0	4.7 J	5.4 J	6.2 J
alpha-BHC	0.09	ND / 0.057	0.047 J	0.038	0.031 J	0.052 / 0.066	0.028	0.016 J	0.029 J	ND	0.060/0.047 J

FU (~14')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	ND	ND	0.43 J	ND	ND / ND	ND	3.2 J	ND	ND	ND / ND	ND
TCE	NA	ND	0.11 J	ND	ND / ND	ND	ND	ND	ND	0.15 J /0.15 J	ND
VC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	4.5	4.1	3.3 J	1.1	3.9 / 4.7	3.8	2.9	3.4	3.4	1.7 J / 3.1 J	1.1
alpha-BHC	ND	ND	0.035 J	0.036	0.032 J / 0.031 J	0.039	0.034	0.032 J	0.051 JN	ND / ND	0.051 J

NUS-3S (~14')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	NS	ND	0.37 J	ND	ND	ND	ND	ND	ND	ND	ND
TCE	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
VC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	NS	ND	ND	ND	R	NA	NA	NA	NA	NA	NA
alpha-BHC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

MW-3S (~14')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	ND	4.6 JT / 33.2 JD	1.1	ND	ND	ND	ND	ND	ND	ND	2.9
TCE	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
VC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	ND	ND	ND	ND	R	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE LEGEND

Well ID
Depth
Sample Round

QD (~48')	LTM5 (2008)
Arsenic	ND / ND
TCE	3.0 / 1.8
VC	ND

Parameters

Concentration (ug/l) (sample result/field duplicate result if collected.)

NI - Not installed
NS - Not sampled during this event
ND - Analyzed for, but not detected
NA - Not analyzed for
T - Total metals (Unfiltered)
D - Dissolved metals (Filtered)
R - Result rejected
J - Estimated value
JN - Results Qualified approximate due to excursions
Highlighted Cell - Exceeds criteria.

Criteria used are most stringent of current Federal and State MCLs and NJGWQS, as follows:
Arsenic - 3 ug/l
TCE - 1 ug/l
VC - 1 ug/l
Dinoseb - 7 ug/l
alpha - BHC - 0.02 ug/l

LEGEND

- OVERBURDEN MONITORING WELL
- TRANSITION MONITORING WELL
- CIC SITE OUTLINE
- CIC STUDY AREA
- GRASS SWALE
- RIP RAP CHANNEL
- APPROXIMATE LOCATION OF FORMER DISPOSAL AREAS

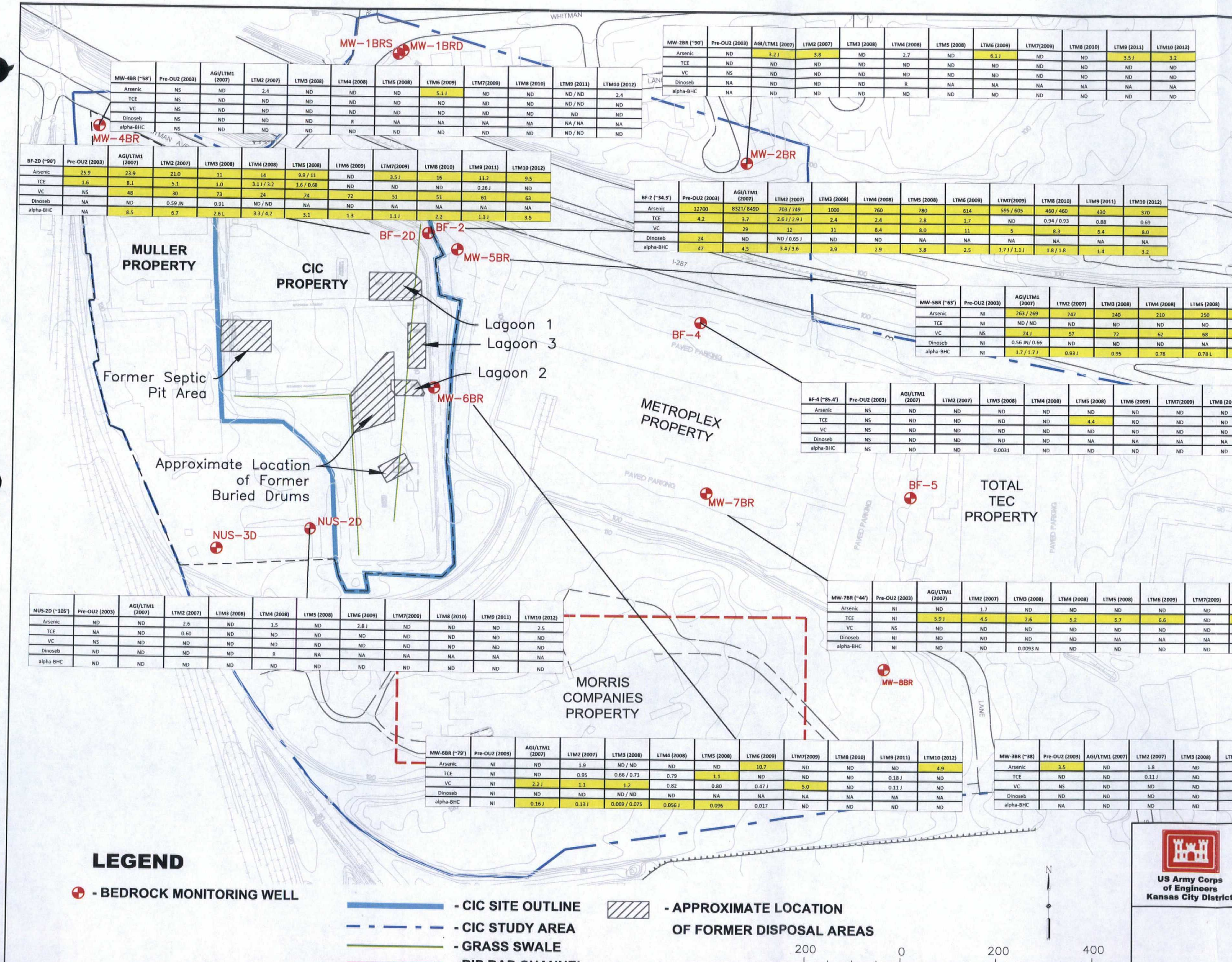
US Army Corps of Engineers Kansas City District

Chemical Insecticide Corporartion
Edison Township, Middlesex County, NJ
OU 4 Groundwater

CTI and Associates, Inc.

Figure 4-3

OVERBURDEN AND TRANSITION WELL DATA



MW-4BR (~58')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	NS	ND	2.4	ND	ND	ND	5.1 J	ND	ND	ND / ND	2.4
TCE	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND / ND	ND
VC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	NS	ND	ND	ND	R	NA	NA	NA	NA	NA / NA	NA
alpha-BHC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND / ND	ND

MW-2BR (~90')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	ND	3.2 J	3.8	ND	2.7	ND	6.1 J	ND	ND	3.5 J	3.2
TCE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
VC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	NA	ND	ND	ND	R	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

BF-2D (~90')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	25.9	23.9	21.0	11	14	9.9 / 11	ND	3.5 J	16	11.2	9.5
TCE	1.6	8.1	5.1	1.0	3.1 J / 3.2	1.6 / 0.68	ND	ND	ND	0.26 J	ND
VC	NS	48	30	73	24	74	72	51	51	61	63
Dinoseb	NA	ND	0.59 JN	0.91	ND / ND	NA	ND	NA	NA	NA	NA
alpha-BHC	NA	8.5	6.7	2.6 L	3.3 / 4.2	3.1	1.3	1.1 J	2.2	1.3 J	3.5

BF-2 (~34.5')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	12700	832T/ 849D	703 / 749	1000	760	780	614	595 / 605	460 / 460	430	370
TCE	4.2	3.7	2.6 J / 2.9 J	2.4	2.4	2.8	1.7	ND	0.94 / 0.93	0.88	0.69
VC		29	12	11	8.4	8.0	11	5	8.3	6.4	8.0
Dinoseb	24	ND	ND / 0.65 J	ND	ND	NA	NA	NA	NA	NA	NA
alpha-BHC	47	4.5	3.4 / 3.6	3.9	2.9	3.8	2.5	1.7 J / 1.1 J	1.8 / 1.8	1.4	3.2

TABLE LEGEND

Well ID
Depth
Sample Round

Parameters

MW-6BR (~79')	LTM3 (2008)
Arsenic	ND / ND
TCE	0.66 / 0.71
VC	1.2

Concentration (ug/l) (sample result/field duplicate result if collected.)

NI - Not installed
NS - Not sampled during this event
ND - Analyzed for, but not detected
NA - Not analyzed for
T - Total metals (Unfiltered)
D - Dissolved metals (Filtered)
R - Result rejected
J - Estimated value
JN - Results Qualified approximate due to excursions
Highlighted Cell - Exceeds criteria.

Criteria used are most stringent of current Federal and State MCLs and NJGWQS, as follows:
Arsenic - 3 ug/l
TCE - 1 ug/l
VC - 1 ug/l
Dinoseb - 7 ug/l
alpha - BHC - 0.02 ug/l

MW-5BR (~63')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	NI	263 / 269	247	240	210	250	214	180	150	135	160
TCE	NI	ND / ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
VC	NS	74 J	57	72	62	68	63	56	54	66	76
Dinoseb	NI	0.56 JN/ 0.66	ND	ND	ND	NA	NA	NA	NA	NA	NA
alpha-BHC	NI	1.7 / 1.7 J	0.93 J	0.95	0.78	0.78 L	0.64	0.19 J	0.63	0.47	1.5

BF-4 (~85.4')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TCE	NS	ND	ND	ND	ND	4.4	ND	ND	ND	ND	ND
VC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	NS	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
alpha-BHC	NS	ND	ND	0.0031	ND	ND	ND	ND	ND	ND	ND

MW-7BR (~44')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	NI	ND	1.7	ND	ND	ND	ND	ND	ND	ND	ND
TCE	NI	5.9 J	4.5	2.6	5.2	5.7	6.6	ND	2.7	1.6	1.0
VC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	NI	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
alpha-BHC	NI	ND	ND	0.0093 N	ND	ND	ND	ND	ND	ND	ND

NUS-2D (~105')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	ND	ND	2.6	ND	1.5	ND	2.8 J	ND	ND	ND	2.5
TCE	NA	ND	0.60	ND	ND	ND	ND	ND	ND	ND	ND
VC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	ND	ND	ND	ND	R	NA	NA	NA	NA	NA	NA
alpha-BHC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

MW-6BR (~79')	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	NI	ND	1.9	ND / ND	ND	ND	10.7	ND	ND	ND	4.9
TCE	NI	ND	0.95	0.66 / 0.71	0.79	1.1	ND	ND	ND	0.18 J	ND
VC	NI	2.2 J	1.1	1.2	0.82	0.80	0.47 J	5.0	ND	0.11 J	ND
Dinoseb	NI	ND	ND	ND / ND	ND	NA	NA	NA	NA	NA	NA
alpha-BHC	NI	0.16 J	0.13 J	0.069 / 0.075	0.056 J	0.096	0.017	ND	ND	ND	ND

MW-3BR (~38)	Pre-OU2 (2003)	AGI/LTM1 (2007)	LTM2 (2007)	LTM3 (2008)	LTM4 (2008)	LTM5 (2008)	LTM6 (2009)	LTM7(2009)	LTM8 (2010)	LTM9 (2011)	LTM10 (2012)
Arsenic	3.5	ND	1.8	ND	ND	ND	ND	ND	ND	ND	1.9
TCE	ND	ND	0.11 J	ND	ND	ND	ND	ND	ND	ND	ND
VC	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

LEGEND

- BEDROCK MONITORING WELL
- CIC SITE OUTLINE
- CIC STUDY AREA
- GRASS SWALE
- RIP RAP CHANNEL
- APPROXIMATE LOCATION OF FORMER DISPOSAL AREAS

N

200 0 200 400
SCALE IN FEET

US Army Corps of Engineers Kansas City District

Chemical Insecticide Corporartion
Edison Township, Middlesex County, NJ
OU 4 Groundwater

CTI and Associates, Inc.

Figure 4-4

BEDROCK WELL DATA